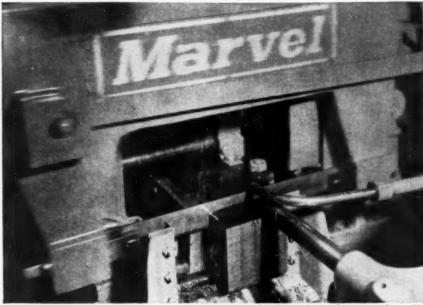
Machine and Tool
BLUE BOOK

اعاماه واواعادا

A Hitchcock Publication
NOVEMBER, · 1956



This is a MARVEL High-Speed-Edge Hack Saw Blade Cutting a 4" s 4" Titanium Billet

### EVERYTHING'S IMPROVED BUT THE GUARAN

33 years ago, MARVEL introduced the first weldededge hack saw blades... guaranteed them to be shatterproof... and a new concept of power hack Blades which were the best on

sawing came into existence.

In combining, by welding, two materials—a narrow, high speed steel cutting edge, and a tough alloy steel body, MARVEL pioneered the modern hack saw blade.

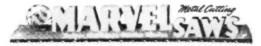
When operators learned they could apply the heaviest feed pressures and highest speeds to the new MARVEL Blades with complete confidence that they would never shatter or "explode" to cause them personal injury, hack sawing began the approach to its present high level of efficiency. Even cutting "exotic" metals, such as titanium, where heavier feed pressures are a necessity, the MARVEL Blade does an outstanding job and is completely safe.

Today's MARVEL High-Speed-Edge Hack Saw Blades are greatly improved, even over the MARVEL Blades which were the best on the market a few years ago. Advanced metallurgy has produced better steels; new heat treating and manufacturing techniques have brought further improvements. The only thin; unchanged is the Guarantee; THEY ARE SHATTERPROOF!

If you haven't used MARVEL High-Speed-Edge Hack Saw Blades recently, try them on your saws for a month and see the difference a truly superior blade can mean in higher speeds, greater accuracy, lower cost per cut, and guaranteed safety to operating personnel. Your nearby MARVEL Distributor carries a complete stock of MARVEL High-Speed-Edge Blades.

Write for Bulletin CT-175 which has complete details on MARVEL High-Speed-Edge Hack Saw Blades.

ARMSTRONG-BLUM MFG. CO.





#### **SUNNEN EQUIPMENT CATALOG #SP 11**

SOLVES 1. D. & O. D. PRODUCTION PROBLEMS AND SHOWS SUNNER HONING EQUIPMENT AND BENEFITS.



- Fast Stock Removal
- · Precision I.D. and O.D. Sizing
- Controlled Surface Finish
- Guaranteed Straightness and Roundness
- Low initial cost—Low cost per piece
- No Chucking, Jigs or Fixtures

Also gives details on Sunnen's new Precision Hole Gage and Size Setting Fixture combination. The set that can measure to ¼ tenths (.000025") without gage blocks or other setting masters.

**ASK US FOR YOUR FREE COPY** 

We'll mail it promptly without obligation.



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7922-K Manchester Ave. • St. Louis 17, Mo.

R PRODUCTS

7922-K Manchester Ave. • St. Louis 17, Canadian Factory: Chatham, Ontario

8831



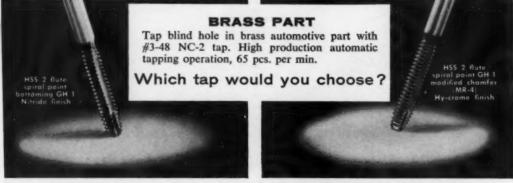






### Take the HY-PRO "TAP-nology" TEST

and see how you score in selection for savings



The HY-PRO MR-4 tap with Hy-crome finish (right) produced 8.2 times the number of holes per tap as obtained with the bottoming Nitride finish tap.



The new HY-PRO "CR" Series, #307 tap 3 Spiral Flutes (left) produced 4.2 times the number of holes per tap obtained with the 4 flute tap.

Call your local
HY-PRO
DISTRIBUTOR
for standard taps

FROM STOCK

Did you pick the right taps? If not, just remember similar errors in selection are common among tap users who buy taps by "habit" instead of *comparative performance*.

Today, tap selection is more difficult than ever, with so many new metals, alloys and plastics in industrial use. So be sure that your "TAP-nology" is up to date. Consult your HY-PRO tap engineering specialist. It costs nothing . . . and these examples show how much it can pay off for you. Write: Dept. H.

#### **HY-PRO TOOL COMPANY**

NEW BEDFORD, MASS., U. S. A. Use postpaid card. Circle No. 202



### NEW

line of **Bliss presses** featuring



All moving parts are interchangeable with standard inclinables

Rugged, compact, these reinforced welded steel frame presses are designed to give maximum rigidity and minimum "spring" under load.

All moving parts enclosed for greater safety-yet instantly accessible for adjustment. Probably most important is that these parts are standard Bliss inclinable press parts. This means you can be sure of quick parts service wherever you're located!

Sizes range from 4-ton bench models with a 12" throat to a 60-ton press with a throat almost three feet deep. You can also have extended bodies, mechanical or air friction clutches, automatic lubrication, other features. Why not write for details.

is more than a name . . . it's a guarantee!

E. W. BLISS COMPANY · Canton, Ohio

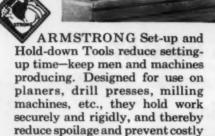
### ARMSTRONG

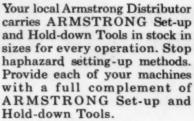
SET-UP

HOLD-DOW TOOLS



PLANER











STEP BLOCK





accidents.























STRAP CLAMPS

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MACHINE and TOOL BLUE BOOK

### Machine and Tool BLUE BOOK

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## COST CONSCIOUS?

# FULMER Honing Machines COST LESS

... To Purchase

... Install ... Operate

... Maintain ... Modify

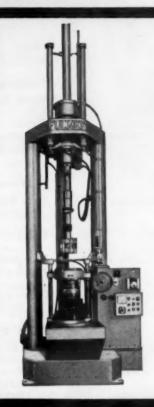
Fulmer Honing Machines are better designed for accurate performance . . . better constructed for years of economical operation . . . None more flexible or easily modified. Automatic feeding, sizing, stone wear compensation, and other features available. All this—And never a charge for service!

Cost conscious customers-

call FULMER

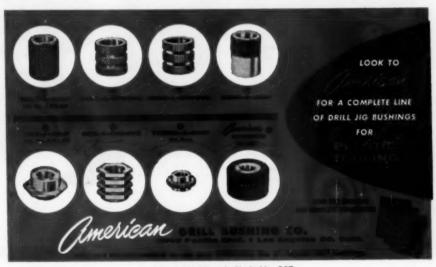
#### C. ALLEN FULMER CO.

Dept. 19-K • 107 E. Fourth St Cincinnati 2, Ohio • MA 1-4683









from

the Space A

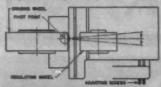
Laboratories



Highest quality finish is assured through Centuramic's new regulating wheel drive.



Cleaner working area. Mist control unit (extra) prevents splashing of cutting fluid.



Quicker setup is attained by Conturamic's swivel plate mounting of the regulating wheel housing.



Zero-maintenance PILMATIC bearings, exclusive with Cincinnati, are incorporated in the Centuramic.

# New CINCINNATI 210-6



BUILDERS OF PRECISION GRINDING MACHINES: CENTERTYPE . CENTERLESS . MICRO-CENTRIC

THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9. OHIO

# Cenjuramic makes it easier to Centerless Grind Small Quantities

Centuramic is a new name in low-cost, precision centerless grinding. Centuramic, a product of Cincinnati's Grinding Machine Division, extends the advantages of centerless grinding to more shops than ever before.

These new machines are convenient to operate and set up because of wider throat opening between the wheels . . . unobstructed floor space wherever the operator needs to stand . . . toe space at the floor line . . . infinitely variable regulating wheel speeds . . . center mounted chain drive for the regulating wheel spindle, arranged to promote the highest quality finish on the work . . . built-in mist control unit\* . . . rear infeed controls.\*

And maintenance is minimized to the vanishing point. Hydraulic unit, for example, is mounted outside where it's accessible . . . no twist, no bind on the regulating wheel spindle drive chain . . . FILMATIC grinding wheel spindle bearings never wear out or require adjustment. Many more feature-advantages are outlined in catalog G-728. Write for a copy today.

\*Extra cost equipment

New CINCINNATI 210-6 Centuramic Centerless Grinding Machine, the "Handy Andy" of the Centuramic line. Cost-reducing extra equipment: Vari-Pitch Infeed Attachment, micrometer handwheel, profile regulating wheel truing.



ROLL . CHUCKING . CENTERLESS LAPPING

CINCINNATI



Unlocked position \* In this position tools are inserted or removed.





TREE FEATURE

The Tree Rapid-Lok is a collet adapter designed to hold end mills, boring bars, and other tooling accurately, securely and with great rapidity on both horizontal and vertical mills, jig borers, boring bars and other machines. It is an adaptation of an exclusive

feature which has been proved in use on Tree milling machines over a period of years.



Locked position \*

Handle is moved upward as shown to lock tools securely. Desired

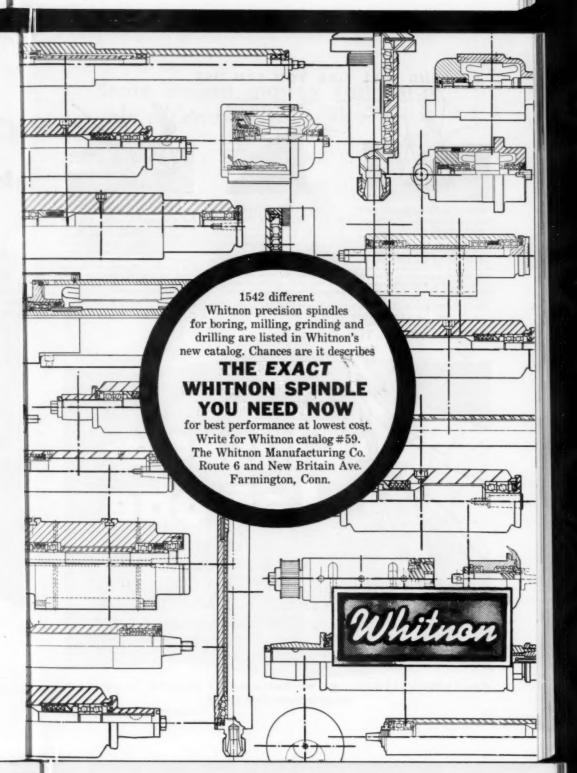
locking pressure obtained by nose adjust-

ment.

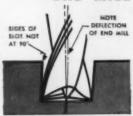
Working position \* Tool now securely held in position—handle removed.



For Full Information Write TOOL & DIE WORKS RACINE, WISCONSIN

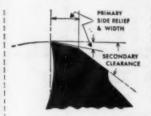


#### END MILL TIPS YOU CAN USE



#### "WOBBLE"...ITS CAUSE AND CURE

Non-perpendicular sides of a slot can be caused by a worn spindle, excessive flute length, or too slow spindle speed. This "wobble" slot is actually a deflection of the end mill caused by one flute hogging into the cut. If the proper end mill with shortest necessary flute length is being used, eliminate spindle runout and increase its speed.



#### END MILL RESHARPENING

Always consider the material to be cut, and grind to limits recommended by the tool manufacturer. Resharpen to produce just enough primary relief to eliminate drag. Too much causes chatter... brings on rapid dulling. Secondary relief depends on the size of the end mill, the width of the primary relief, and the feeds being used.



#### ABOUT CUTTING FLUIDS

End mills require cutting fluids to protect the tool, control temperatures, and provide lubrication. Multiple streams provide more cooling than a slaw heavy flow. Present day jet cooling methods do not provide sufficient cooling because of greater tooth-to-work contact in end milling as opposed to turning operations.

FOR QUICK SOLUTIONS TO ALL YOUR DRILLING-REAMING-END MILLING PROBLEMS, SEE CHICAGO-LATROBE CATALOG No. 58, OR CONSULT A C-L SERVICE ENGINEER

BEST TIP OF ALL . . .



CHICAGO-LATROBE 418 W. ONTARIO ST., CHICAGO 10, ILLINOIS
Use postpaid cord. Circle No. 212

### Start saving money <u>right</u> <u>now</u> on threading jobs like these



SINK FLANGE - STAINLESS 3.341 IN. DIA. - 10 TPI THREADING TIME 37 SECONDS



STUD TITANIUM .25 IN. DIA. 28 TPI IHREADING TIME 20 SECOND.



FOCUSING NUT - ALUMINUM 1 IN DIA - 16 TPI 6 START THREADING TIME 25 SECONDS



SCROLL - A.I.S.I. 4150 500 LEAD THREADING TIME - 6 MIN 12 SECS



BODY - STAINLESS STEEL 1.25 IN. DIA. - 24 TPI THREADING TIME - 7 SECONDS



WORM - MILD STEEL .9563 IN. DIA. 26 D.P. 8 START IHREADING TIME 3 MIN 20 SECS



VALVE STEM - BRASS 2 START 10 TPL STUB ACME PREADING TIME 23 SECONDS



ADAPTOR - ZINC ALLOY 11 TPI-INT, 16 TPI-EXT, SIMULTANEOUS THREADING TIME - 12 SECONDS



FUEL NOZZLE - AMS-5640 1.040 IN. DIA. 12 TPI THREADING TIME 12 SECONDS

#### WITH CRI-DAN THREADING LATHES

. . . cut costs with simple single-point carbide tools. Eliminate expense of thread milling cutters or thread grinding wheels.

... assure extremely accurate lead and thread form and exceptional finish on materials that don't allow economical threading by other methods.

... handle any material from titanium or toughest alloy steels to brass and other non-ferrous metals with a wide selection of spindle speeds and feeds to meet all job requirements.

. . . set up fast to produce single- or multiple-start, coarse or fine, left- or right-hand threads, parallel or tapered with metric or inch pitches — thread up to shoulders on all types of internal and external operations.

Why put off the savings the CRI-DAN method can bring you right now? Ask your Gisholt Representative for complete details. Or write us for literature or cost estimates on your particular work.



Two models are available. The smaller Model B is shown. Rugged saddle supports fast-acting threading slide, easily positioned along bed. Complete change-over from job to job can be made in 15 minutes.



GISHOLT

Investigate Gisholt's Extended
Payment and Leasing Plans

Factory-Rebuilt Machines with New-Machine Guarantee

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes

#### A NEW HEAVY DUTY 10 FT.-10 GAUGE SHEAR



Outstanding in every detail this 10 ft. 10 gauge precision power squaring shear is engineered and built to shear sheet metal accurately and continuously at full-rated capacity.

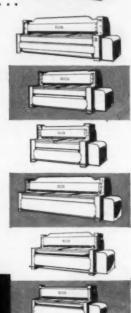
Pexto Power Shears range from 4 to 10 foot capacities. Six models handle every shearing problem from the lightest gauges through 10 gauge sheet. Also Foot Shears in a complete range of sizes.

Write for Power Shear Bulletin No. 60



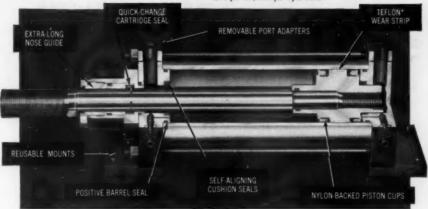
SOUTHINGTON, CONN., U.S.A.

A complete line of machines and tools for Sheet Metal Fabrication



# new... new... alvair HEAVY-DUTY AIR AND HYDRAULIC CYLINDERS

200 psi air, 500 psi hydraulic



\*Trade name for Du Pont tetrafluoroethylene resin

#### ... will provide efficient, dependable service on your high-production equipment

A look inside shows you why Valvair heavyduty cylinders belong on your high-production machines! Built by Valvair, makers of famous SPEED KING valves, these heavy-duty cylinders provide design, construction and component material features coordinated to assure efficient operation, longest service life and minimum downtime.

Whether you're ordering new machines, or modernizing equipment now in use, it'll pay you to specify Valvair heavy-duty cylinders for all your high-production machines. A full range of bore and rod sizes, interchangeable and reusable mountings, stroke lengths and cushioning options are available.

Call in your nearby Valvair or Bellows field engineer today . . . take advantage of one-source responsibility for all your control system needs . . . cylinders, valves, manifolds, filters, regulators and lubricators.



For detailed information, write for Bulletin VC-800. Address Dept. MTB-1159, Valvair Corporation, Akron 11, Ohio



8038-

#### NEW SMALL SIZE

### FASTER ACCURATE ANGULAR SET-UP OF SMALL WORK



Magna-Sine (Model B-3-MS)
With 4" x 4" Working Area



Sine Plate (Model B-3-SP) With 4" x 4" Working Area

#### ROBBINS MAGNA-SINE

This new smaller Magna-Sine has all the time-saving, accurate angular set-up features found in larger Robbins Magna-Sines. Small to medium size work can now be set up in minutes instead of hours and with a lower investment in equipment. Magna-Sine table has a strong, fine pole, permanent magnet chuck that firmly holds small work without distortion.

#### ROBBINS SINE PLATE

Robbins small Sine Plate is manufactured to the same high standards of accuracy as the Magna-Sine. This precision makes it ideally suited for angular inspection set-ups. The ground surface of the non-magnetic table has tapped holes for convenient clamping of any work. Also, sturdy construction makes this small Sine Plate extremely suitable for light machining operations.

Compound angles are quickly and easily set up with this Robbins equipment by combining either two Magna-Sines, a Magna-Sine with a Sine Plate, or two Sine Plates. Now, with lower initial investment, every shop can secure accurate angular set-ups for small work. With Robbins equipment, you do a better job, faster and at less cost.

OMER E.

11961 DIXIE AVENUE

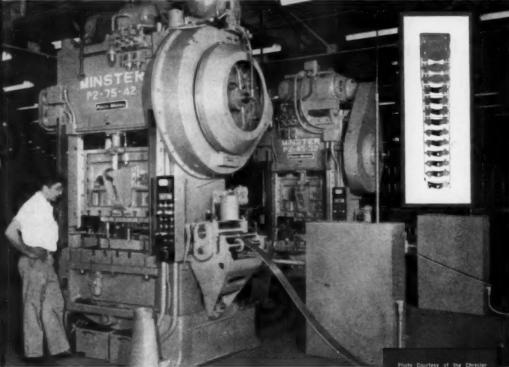
Kobbins DEPT. A

COMPANY

DETROIT 39, MICH.

Lower your per unit stamping cost with

### AUTOMATIC PRODUCTION



#### Minster Piece-Maker® Presses

You get more parts per hour at a lower unit cost when you produce stampings automatically. Costs shrink as you eliminate expensive rehandling and storage of parts between operations.

Minster offers a complete range of press types and sizes for all kinds of profitable automatic production . . . long runs, short runs, big parts or tiny parts.

The right Minster press, with feed equipment matched to both press and job, can lower your unit costs, give you maximum productivity. Want more facts? Write or call us today.

The Minster Machine Company - Minster, Ohio

## MINS

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Photo Courtesy of the Chrysler Corporation, Indianapolis, Indiana.

Minster Piece-Maker automatic production presses are designed for rigidity and built with precision. From 20 to 300 ton capacity.

### MORSE



helps to make

### MACK



mighty...

two famous names noted for

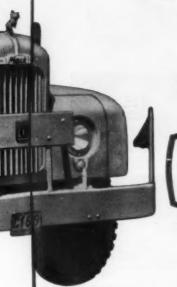
### GUTS

Mighty Mack Trucks...and the Morse cutting tools used to make them...are equally famous for guts. Mack on the road. Morse on the production line. Proof once again that to build the best you must build with the best.

Sound economics? Sure. Longer lasting more efficient tools invariably produce long-run economy.

Why not prove it to yourself. Your Morse-Franchised Distributor will gladly demonstrate to you the practical economics of buying the best in cutting tools... Morse, of course. Call him in today.

P.S. If you want to get the most out of the best twist drills made today, take a look at the Morse Production Drill Point Grinder. It outpoints all other machines. Write for new illustrated bulletin.





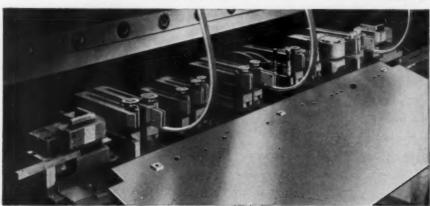
MORSE TWIST DRILL & MACHINE COMPANY
NEW BEDFORD, MASSACHUSETTS

WAREHOUSES IN NEW YORK, CHICAGO, DETROIT, DALLAS, SAN FRANCISCO
A Division of VAN NORMAN INDUSTRIES, INC.

MORSE means "THE MOST" in Cutting Tools .

#### NEW STRIPPIT UNITS

... stake nuts permanently with every press stroke!



STRIPPIT PIERCE NUT UNITS save operations, time and money in assembly panel production with single-stroke insertion of Fabristeel Multipierce Nuts\* into sheet metal up to .125" thick.

Permanent Fustening by an Exclusive New Process — as nut pierces stock, metal flows into nut shoulder slot, becoming an integral part of the stock.

High-Speed — fast press setups, automatic feed of nuts to units for long, medium or short runs gets maximum production per press.

Flexibility — Pierce Nut Units can be quickly press-mounted in any desired pattern, changed on short notice, re-used over and over.

\*A Product of Fabristeel Products, Inc.

WRITE FOR DEMONSTRATION on your press! The speed and simplicity of Strippit Pierce Nut operation has to be seen to be believed. Also request new catalog for complete specifications.



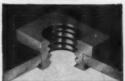
204 Buell Road, Akron, New York



In Canada: Strippit Tool & Machine Company, Brampton, Ont.



Each nut is its own punch, a new one each time



Die button causes material to flow into nut slot



Simultaneous embossing for flush fastening



#### **NEW PINES 3T PRESS**

### Cuts Bending Costs ...... 50%



#### COMPLETE LINE OF BENDING PRESSES

In addition to the Model 3-T, Pines also builds the larger bending presses, illustrated below, which are also establishing outstanding performance records.

#### MODEL 6T FOR MULTIPLE U-FRAME BENDING



Makes two bends of the same or slightly different angles in each of two or more tubes simultaneously. Production of four or more bends with each stroke makes it possible to form 1700 to 3000 bends per hour in tube sizes ranging up to 1" O.D. x .065". When necessary, retractable ram dies are used to release pieces from die grooves. Like 3-T, wing dies move with work, eliminating draw marks, producing bends of superior quality.

#### Makes Bends Progressively to Varied Angles In Multiple Planes 2 to 3 Times Faster

Quality bends at production speeds that are 2 to 3 times faster than conventional methods, are now possible with the new Pines 3-T Bending Press. Many tubular parts in sizes up to 1" O.D. are now formed at net speeds of over 1000 bends an hour. Up to 9 different bend angles can be produced in a single setup. Adjustable automatic indexing stops accurately control depth of ram stroke. Open tooling area permits rapid progressive bending in varied planes.

#### Wing Die Design Assures Quality Bends

High production speed is just part of the story. Unusually smooth, good looking bends are produced to meet the quality demands of automotive, furniture, toy, office equipment, and appliance manufacturers. Wing dies of the press are designed to move in ways as a bend is made, and their pivoting action is hydraulically cushioned through bearing-mounted rocker arms. This principle eliminates scratches or draw marks and produces wrinkle-free bends with very little distortion. Get the complete story on cost cutting advantages of this new Bending Press today.

#### MODEL 1900 FOR PROGRESSIVE BENDING OF TUBES UP TO 2" O.D.



Designed for high speed bending of parts requiring a variety of bends in different planes, such as automotive exhaust and tail-pipes, or similar work. Major features are automatic angle indexing and greaser working clearance which permits completing, for example, 90% of all bends in a tail-pipe with a single toolling setup. Press handles stock sizes up to 2" O.D. handles stock sizes up to 2" O.D.

### PINES ENGINEERING CO., INC.

islists in Tube Febricating Machinery 881 WALNUT . AURORA, ILLINGIS

WRITE FOR FREE DATA SHEETS To keep abreast with bonding, write for free capies of "Pines Naws" get letted date on relary and press-type machines, and up to



PRODUCTION BENDING . DEBURRING . CHAMFERING MACHINERY



### Here's Why Continental Counterbore Drives Never Bind! Never Fail!

Continental Counterbores operate precision-smooth and detach with a twist of the wrist because the driving forces generate compressing not shearing action in the holder. They never bind, deliver long-lasting, trouble-free operation.

In Continental Counterbores, you get extra torsional rigidity because drive lugs are close to the seating shoulder of the cutter. Double lugs on the cutter engage double abutments in the holder to form a powerful tool. But best testimony to the satisfaction you get from these counterbores is this: no one has ever reported failure of a Continental Counterbore Drive! For more information, call your local Ex-Cell-O Representative or write to Continental Tool Works in Detroit. Available individually or in a choice of three sets.



EX-CELL-O CORPORATION

**DETROIT 32, MICHIGAN** 

### WHAT'S UP FRONT...

EASY-STARTING TEETH

THIS THE EASIEST HANDLING HAND BLADE YOU EVER USED!

MILFORD's exclusive EASY-STARTING TEETH - fine milled teeth at the forward end

of the blade - let you start the cut

at any angle on the first stroke. If it must be sawed by hand you'll do the job faster and easier with a MILFORD Blade! For all your hand hack sawing jobs, use the MILFORD Flexible REZISTOR teeth as sharp, fast-cutting and long-lasting as any all-hard blade. Back is tough and resilient . . . completely shatterproof in normal use.

BUY FROM YOUR MILFORD DISTRIBUTOR . . . a local businessman,



who stocks the tools and equipment you need. You'll SAVE TIME, CUT BUYING COSTS and REDUCE INVENTORIES.

Ask for your free copy of the circular "It's Flexible."

THE HENRY G. THOMPSON & SON CO. Saw Blade Specialists for Over 80 Years

NEW HAVEN 5, CONNECTICUT

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MACHINE and TOOL BLUE BOOK

MILFORD

Flexible Rezistor

SHATTERPROOF HIGH SPEED STEEL

HAND HACK

SAW BLADE

### DIEMAKERS ...

Free-machining
DESEGATIZED\*
HIGH ALLOY
DIE STEELS



grades regularly stocked for long-run die applications...

- . OLYMPIC FM (Type D-4)
  - ... for typical long-run applications
- . BR-4 FM (Type 0-7)
  - , . , for extreme abrasive service
- GSN FM (Type D-9)
  - ... to meet non-deforming requirements
- . COBALT CHROME FM (Type D-8)
  - ... for extra resistance to galling and pickup

Latrobe's 12% chromium die steels are easier to work, easier to machine . . . because they contain evenly-dispersed, fine alloy sulphides which permit faster speeds and feeds, and result in better machined surfaces.

As a result of Latrobe's DESEGATIZED process of manufacture, these steels are fully-uniform . . . free of harmful carbide segregations. They're tougher, respond readily to heat treatment, and possess unusual wear resistance characteristics.

For better die steels and technical service, call your Latrobe representative today!

LATROS Metalmasters



LATROBE STEEL COMPANY

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MARTPORO · LOS AMBELES · MIAMI · MILWAUKEE · NEW YORK
PMILADELPHIA · PITTSBURGH · SAN LEANDRO · TOLEDO

# WISCONSIN multiple-spindle Convertible type head for drilling, tapping, spot facing, counterboring



Master Drive Head with Pick-off Gears.

If you have found that convertible type beads fit into your production program most effectively, you will want to profit by the experience of the WISCONSIN engineering staff in designing and building heads of this type.

WISCONSIN designs and builds all of the popular and widely used types of drill heads: Standard Multiple-Spindle Adjustable drilling and tapping heads; Fixed Spindle drilling and tapping heads; Rotating Heads; Bracket-Type Universal Joint Drill Heads and special machinery.



Cluster Box Housing showing Hole Pattern. Can be furnished with round, square or rectangular positioning.



Slip-Type Spindle with Idler Gears used in all convertibletype heads.



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Optional Features Truing Device with one dressing head—for radius-type profiling. Hand-operated truing device. Coolant temperature control system. Attachment to grind anvils for thread flank micrometers, including collet.

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Pitch Range.......6—80 t.p.i.

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TINM WARE		.,			
	YES			REMARKS	
	1		1	Readily	
Are its products available from stock?	1			All over America	
Do local distributors have stocks?			1	866 sizes	
Pagrings /			+	667 sizes	
Cast Bronze Bearings  Sintered Oil-filled Bronze Bearings			+	267 sizes	
			+	84 sizes	
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Sintered Oil-filled Broize on	V	4	+	Bunting 72 Bronze Alloy	
Aluminum 13" Bars	1	.1	1	(SAF 660)	
and the product?	1		- 1	Alcoa Aluminum	
Is it a high quality product?	-	-	-	Always	
Are stock sintered bearings made to ASTM		1			
Standards?	-	-	,	Small lots at big run	
Standards.	1	- 1	~	prices	
Any restrictions on quantity?	-			Large reserve facilities	
Does it render extraordinary	1	1		Two large modern plants	
service in emergencies?	-	1		Meets every usual need	
				Meets every usual most	
				See below	
Does the company publish catalogs?			1	In all catalogs and in special literature	
Dues the data?	1	1		Over 50,000 patterns for	
Does it publish technical data?	-	-		over 50,000 patterns to customer free use	
make products to blue	print?	1			
Does the company make products to blueprint?				It's free	
Does it give competent engineering aid?				Over 50 years	
Does it give competent list the company well established?		V			

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BAR CAND 40 lists 138 sizes of Bunting Bearing Aluminum 13" Bars.



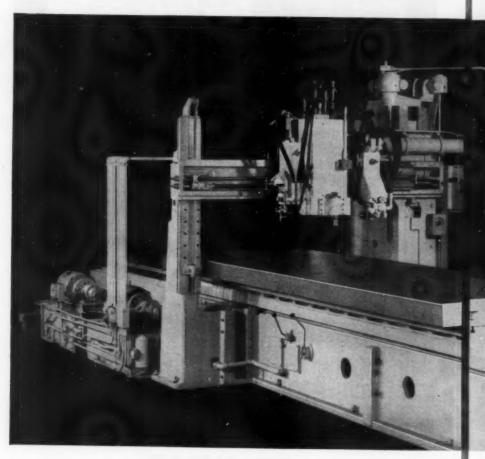
CATALOG S8 lists Bunting Cast Bronze and Sintered Oil-filled Bronze Bearings and



BUNTING'S "ENCINEERING HANDBOOK ON POWDER METALLURGY" details manufacture and use of sintered metal bearings and parts.

Bunting, local distributors are listed in classified section of telephone directory under "BARS-BRONZE" or "BEARINGS-BRONZE"

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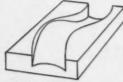


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In many cases parts are duplicated in 50% less time at vastly less east. Other advantages and features of the BRIDGEPORT Syschro-Trace instude:

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If the property of the syschro-Trace is similar to numerical act natural and takes a pre-determined cut with every gass of the cutter, an assurate estimate of machining time required for die or part may be made. Estimating servany is further simplified since the BRIDGEPORT Synchro-Trace operates continuously, without stopping. until part is complete.

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. . . ability to use as a standard hand-feed machine.
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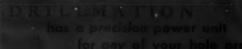
uniform cutting feed in any plane, vertical or horizontal, saving tool costs and assuring greater accuracy because cutter neither overcuts nor undercuts on vertical walls. Uniform load on cutter extends tool life.

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. all machining functions automatically stop when automatic shut-down knob is engaged and cutter has finished its last scanning pass.

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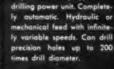
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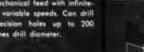
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If you have the problem of producing holes in extremely hard materials, you need the new hollow cold-point drill or diamond impregnated core

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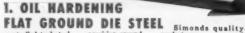
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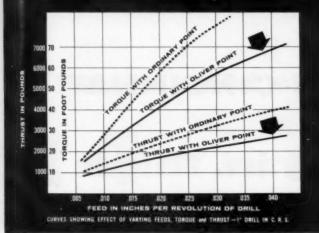
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Oliver's sharpening principle is to grind the drill point so that increased clearance is obtained at the center of the drill. Each lip does its equal share and the theoretically perfect point permits easier penetration. Less feeding pressure means savings on drilling machine repairs, power and transmission costs and the drills themselves. The Oliver point has been successfully used since 1921.

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It is a widely accepted fact that for a given feed the angle of helix of the feed is greater as it approaches the center. It is this reason that makes increased clearance at the center of the



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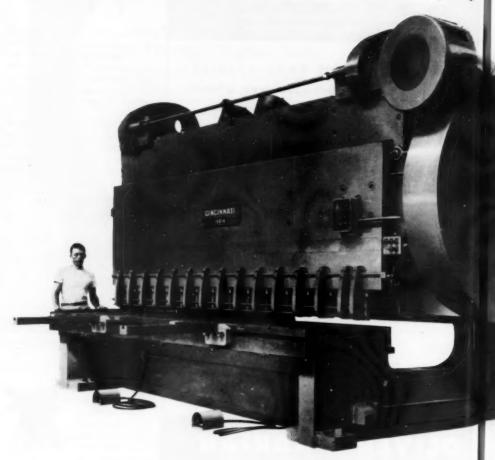
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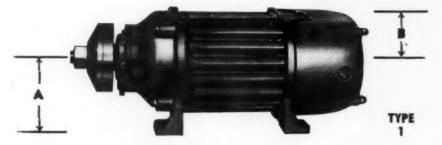


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"A"	HP at	FRAME	"B"
DIMENSION	3600 RPM	SERIES	DIMENSION
41/2"	1 - 71/2	20	31/4"
51/8"	1 - 20	30	4"
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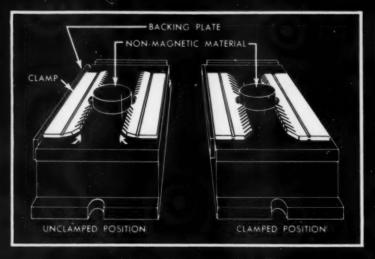
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Use your magnetic chuck to hold non-magnetic materials, too!

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Work-piece is placed on chuck between jaws of Magna-Vise. When chuck is energized, jaws draw down firmly against chuck surface and hold work-piece solidly in place. Magna-Vise quickly repays its low cost. Four sizes, precision made. Priced from \$28.00 to \$55.00. Write Dept. BM 99

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includes 6 complete laps, one of each size (1/4", 1/4"

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courtesy Ready Machine Tool & Die Co., Inc.

#### Gilbert boring mill makes money for Ready Machine Tool & Die

"This 5" Cincinnati Gilbert boring mill is already making money for us, and that's why we bought it," says C. P. Ready, President of Ready Machine Tool & Die Co., Inc., Connersville, Ind.

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**RIVET CATALOG** describes 1388 standard tubular and split rivets and 25 single and multiple motorized automatic rivet



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Line includes automatic single, multiple and automated setters.

#### AIR-POWERED

Line includes automatic single, multiple and automated setters.

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Assures You Precision to the **Finest Degree** to Meet Your Requirements -Backed by the **Name Supreme** in the World of Measurement

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(JOHANSSON) and accessories. Short deliveries, Inspection and reconditioning service available at our plant.

#### INTERNAL INDICATORS

(for inside measurements ,155 to 24 inches), Scale range plus or minus .001 graduated to .0001 and minus .020 graduated to .0001.

#### MIKROKATOR

(Amplifier—for outside measurements) Graduations .0001 to .000001 or .01M and in both inch and millimeter. to .0002M.

#### OTHER JOHANSSON PRODUCTS

Micrometers, Snap Gages, Extensometers, Dynamometers, Hardness Testers, Surface Finish Indicators, Interferometers, Plugs, Rings and Special Gages.



#### C E J MIKROKATOR 502-E

Mikrokator No. 502-E is a precision instrument for dimensional measurements.

It is provided with a mechanical, frictionless amplification device without sliding bearings or gears and there is no play, wear or binding.

The purpose of the instrument is to give accurate measurements both in mass production checking and in checking individual parts.

The instrument is made in three different designs

Cat. No.	Range	Graduated	Shaft Diameter
502-E-2	.016	.0002	3/8"
502-E-4	.004	.00005	3/8"
502-E-5	.002	.00002	3/8"
502-E-6	.0012	.00001	3/8"

Write for Literature

#### C. E. JO GAGE CO.

SION OF SWEDISH GAGE CO.

10641 HAGGERTY AVE. . BOX 4086 NORTHEASTERN STATION . DEARBORN 1, MICH.

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OK



#### How Allison Wheels help you get Quick, accurate cuts on almost any material or shape

• Abrasive cutting can give you cleaner cuts, faster—on almost any material from titanium to fire brick. But only with the proper cut-off wheel can you get best results. That's where your allison-campbell Field Engineer can help. He can select the allison wheel to cut metals and other hard materials at speeds of just a few seconds per square inch—fine finish, no burn, with little or no burr—accuracy within close tolerances. There's an allison wheel for every abrasive cutting job.

Resincid bonded wheels • for dry abrasive cutting at speeds of 3 to 5 seconds per sq. in.
Rubber bonded wheels • for wet cutting of

all types of steel, alloys, titanium, glass, plastics. Masonry cutting blades, including reinforced types • for wet and dry cutting of fire brick, concrete block, tile, other building materials. Fiberglass reinforced wheels • for extra strength on many foundry jobs.

GET THE COMPLETE STORY! • Write for Bulletin DH-214 for detailed information on abrasive cutting and wide selection of ALLISON wheelspecifications. ALLISON wheels available 3" to 34" diameter, .006" to 3/16" thick. And remember—your ALLISON-CAMPBELL Field Engineer can give you specialized help. Specify ALLISON wheels for efficient, accurate, economical cutting.

#### ALLISON CUTTING WHEELS

Allisen-Campbell Division • American Chain & Cable Company, Inc. 937 Connecticut Avenue, Bridgeport 2, Conn.



#### High spraying speeds—high deposit efficiencies—simplified application

The advantages of applying hard-facing materials in powder form for lower finishing costs have long been known. But slow spraying speeds, low deposit efficiencies and high material costs have hindered their wide application. Now, with the development of the new METCO Type P THERMOSPRAY GUN and the THERMOSPRAY HARD-Facing Alloys, these disadvantages have been overcome.

The Thermospray gun is the first ever developed to operate without compressed air—only oxygen and gas (acetylene or hydrogen) are required. The Thermospray Powders are new, self-fluxing alloys of the nickel-chromium-boron type especially developed to provide dense, corrosion-resistant coatings with hardnesses varying from RC-30 to RC-65, depending on the alloy used. The new Gun applies these materials

faster than any previously available equipment (8 to 10 lbs. per hr.), with deposit efficiencies of over 95%. Depending on requirements, coatings may be fused after spraying, used semi-fused with a newly developed Metco Process, or left unfused.

Here is your opportunity to do your own hard-facing at low cost. For further information send off the coupon. No obligation, of course.



Metallizing

Engineering Co., Inc.
Prospect Ave., Westbury, L. I., New York
Telephone: EDGEWOOD 4-1300

In Great Britain: Metallizing Equipment Co., Ltd. Chobham near Woking, England

The following trade names are the property of Metallizing Engineering Co., Inc.: METCO\*, ThermoSpray \*Reg. U. S. Pat. Off.

Don A. Watson Metallizing Engineering Co., Inc. 1115 Prospect Ave., Westbury, L. I., N. Y.	•
Please send me more information	name
☐ about the New ThermoSpray Gun	company
about ThermoSpray Hard-Facing	street
☐ Please arrange a demonstration in my shop.	cityzonestate

## SYNTRON Vertical Vibratory PARTS FEEDERS



#### increase the efficiency and economy of parts handling

Applications for SYNTRON Parts Feeders in the metal working industry are unlimited.

Whether it's orienting and feeding parts to machining, assembling, packaging, or other automatic operations, SYNTRON has a parts feeder to do the job-more efficient, more dependable and more economical than by slow manual methods.

Custom built, SYNTRON Parts Feeder bowls can be fabricated to orient parts of almost every size, shape, and material. This-plus instantly controllable, high-frequency vibration (3600 vibrations per minute)—assures the maximum flow of parts to meet the requirements of continuous, automatic production lines,

SYNTRON Parts Feeders with electromagnetic drive provide a positive, dependable vibration to move most parts efficiently and at high rates, yet gentle enough to handle delicate, precision parts without damage.

SYNTRON Parts Feeders can increase the efficiency and economy of parts handling.

Write for detailed information

#### SYNTRON COMPANY

300 Lexington Avenue

Homer City, Penna.

#### SPREAD RESISTANCE...

WHERE YOU NEED IT!



Five styles in a broad range of sizes and capacities up to 18°. Drop-forged from selected steel and heat-treated to further increase strength and reduce liability of springing. Screws are made of special grade steel hardened and tempered. Alloy Hoist Hooks add 27 additional capacities to Williams extensive line of carbon and alloy steel hooks. Eye and shank styles in regular and safety patterns. Safe working load capacities up to 70 tons.

Write for new brochure A-575.

Vulcan Eye Bolts are proof-tested to military standards to 50% beyond "safe working load". Plain and shoulder patterns, Blank or threaded. Capacities from 400 lbs. to 16 tons.

all are stronger and safer because ...

#### THEY'RE DROP-FORGED BY WILLIAMS

FOR PROMPT,
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J. N. WILLIAMS & CO.

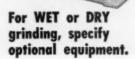
to do small grinding jobs
to MICRO-PRECISION
FAST...

# you, need the SANFORD Model SG SURFACE GRINDER

This unrivalled small parts grinder can be depended upon for micro accuracy. It's easy to use too . . . every hand wheel and operating switch is at your finger tips.

Designed and built by engineers and tool makers of rare foresight for tool, die and gage work, it has been constantly preferred after these many years of proven worth.

Write for fully illustrated literature, replacement parts and special attachments data with price list.



#### PARTIAL SPECIFICATIONS -

Chuck Surface—3"x5" or 4"x6".

Table travel—8", traverse 4".

Vertical head movement—6".

Work area under 4" wheel—6",

with chuck—4".

Standard grinding wheel—
4" x ½" x ½".

Spindle speed—approx. 5500 RPM.

Motor, 1/6 HP, single or 3 ph.,
dynamically balanced.

Dimensions—23" x 30" x 27" high.

Net wt. approx. 160 lbs.

Representatives in major industrial areas



ANGULAR

Set-up time 10 minutes. Grinding time 14 minutes.



RELIEF

The savings on set-up and grinding time for one tool when done on the R-O may appear insignificant—but extend it for a volume run—multiply it by More grinds per tool (3) Better, cleaner cuts (4) Elimination of operations days-then add these other R-O advantages: (1) More cuts per grind (2) 5) Reduced inspection (6) Reduced scrap.

Compare R-O's many advantages over conventional sharpening methods-Then get the R-O story. Send the coupon.

#### FORM RELIEVING FIXTURE

Grinder

Royal Oak Tool and Machine Co. GRINDER DIVISION 29800 Stephenson Hwy. Royal Oak, Mich.

Please forward the R-O catalog

Address

Set-up time 5 minutes. Grinding time 9 min-R-O RELIEF







TO MAKE MORE dollars



Without coolant, this Bulliard lathe makes a .125 rough cut and .050 finish cut using Kennametal Grade K6 inserts in a Kendex\* (patented) holder. Sand holes in the castings add to the difficulty of an interrupted cut. Photos and production data courtesy of American Coleman Company, Littleton, Colorado, manufacturers of trucks, tractors, front drive axies, and related parts.

	50 RPM 24 Minute Tool Life	88 RPM 151/2 Minute Tool Life
Feed	.027	.027
Cutting Time: First side—rough cut First side—finish cut Second side—rough cut Second side—finish cut Total cutting time	7 minutes 7 minutes 5 minutes 5 minutes 24 minutes	4½ minutes 4½ minutes 3¼ minutes 3¼ minutes 15½ minutes
Machine cost per hour Tool cost per hour	\$6.00 .075	\$6.00 .27
Machine and Tool cost/8 hours	\$48.60	\$50.16
Pieces finished per 8 hours	5	9
Cost per piece	\$9.72	\$5.57

#### KENNAMETAL tooling permits 75% SFM increase... cuts cost per piece almost in half

Like many others, this plant is sacrificing pennies in tool costs to make dollars in production profits. At 50 rpm, this boring mill faced cast iron housings at a maximum speed of 289 sfm. Each Kennametal cutting edge faced both sides of two pieces with production averaging 5 pieces per 8-hour shift. When the maximum speed was increased to 510 sfm, the cutting insert had to be changed for each piece.

This reduction in machining time, plus some additional time saved by an improved method of holding the workpiece, enabled production to increase to 9 pieces per shift.

Sacrificing a few pennies of increased tool costs to make dollars in production profits is not a new idea. It has been proven-in-use by many progressive plants, and we will gladly send you records of such operations. These results can be duplicated in other plants where machines and talented operators have been held back by old ideas about tooling and tooling costs.

Ask your Kennametal Carbide Engineer how Kendex\* (patented) tooling can help you get more efficient output from your machines... or write direct for the booklet, "There's Profit in Retiring a Tradition." KENNAMETAL INC., Latrobe, Pennsylvania.



KM-9-7237

### MAKE "IMPOSSIBLE" HOLES

POSSIBLE...

With
Lift Swing
Drilling Fixtures



Use the Lift Swing Drilling Fixture with a double top plate and drill two holes side by side with a minimum of wall thickness in between . . . this is accomplished without "special" drill jig bushings and without difficult-to-grind flats on bushings . . . just drill using one side of the double plate, swing 180° and drill using the other side—fast and simple.

You can drill and ream or you can drill two different diameter holes at the same location; yes, two operations without bushing changes. Lift Swing with a double top plate . . . provides Faster, Easier Tooling; Reduced Tooling Costs; Less Down Time; Increased Production.

Accurate Lift Swing Drilling Fixtures come in either single or double "Swing Away" Top Plate models—and in a range of sizes to fit every need.

Investigate the real production cost savings Accurate Lift Swing Drilling Fixtures can bring you . . .



Write for Lift Swing Tooling Suggestions. Bulletin L5-58

#### ACCURATE BUSHING CO.

ASA Standard Drill Bushings . Precision Parts . Lift-Swing Drilling Fixtures

444 NORTH AVE., GARWOOD, N. J.

#### NOW! for the FIRST time HYDRAULIC FEED on a 10" x 16" grinder



No. 17H

Priced at only

to give you the operating ease and high speed of hydraulic feed for little more than the cost of a hand feed grinder.

For precision surface grinding on tool room or production jobs. you can't beat the Covel No. 17H. The large grinding wheel with plenty of direct power plus high speed hydraulic feed and big crossfeed capacity make it a real money saver. Grinds approximately twice as fast as with a comparable hand feed machine.

First with hard chrome table ways

Preserve original accuracy of hand-scraped V and Flat tableways. Available at extra cost on all Covel Surface Grinders.

Micro-Precision a Covel Tradition-Since 1874

#### **PRECISION** GRINDERS

BENTON HARBOR, MICHIGAN

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Write, wire or call us TODAY We'll gladly show you what the Covel 17H can do for you. Ask for Bulletin BB-119.



EX-CELL-O LAPPING MACHINES DELIVER HIGH SPEED AND ACCURACY AT LOW COST

Ex-Cell-O Lapping Machines eliminate outof-line, out-of-round and incorrect angles
in centers. Result: Guaranteed accuracy in
subsequent machining, scrap is cut by a
healthy margin. Built by Ex-Cell-O, these
machines deliver precision with ease. Remember, don't scrap—center lap—write
for Bulletin 40271—or, better yet, call your
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Center Lapping corrects inaccuracies, assuring precision in subsequent operations between centers.

(XLD) EX-CELL-O FOR PRECISION

EX-CELL-0

MANUFACTURERS OF PRECISION MACHINE TOOLS - GRINDING AND BORING SPINDLES - CUTTING TOOLS - TORQUE ACTUATORS -RAILROAD PINS AND BUSHINGS - DRILL JIG BUSHINGS - AIRCRAFT AND MISCEL-LANEOUS PRODUCTION PARTS - DAIRY EQUIPMENT For Quick Changing Versatility...

# TOOL POSTS & TOOL HOLDERS

No other tool does all that the Aloris Tool Post does. No other Tool Holders can be changed so simply and accurately . . . and no other line is so complete!

You can change quickly and easily from one lathe operation to another. What's more, you eliminate entirely the use of shims as each Aloris Tool Holder has its own built-in height adjustment. The life of your tools will be longer and they can be sharpened without removing them from the Tool Holder.

Truly, with Aloris Tool Posts and Tool Holders you have quick changing versatility on all types of lathe operations.



419 Getty Avenue, Clifton, New Jersey





Electronic parts courtesy Judson Mfg. Co., Inc., Cornwells Heights, Pa.

#### Mirror-bright without polishing, after switch to Sunicut

Boring on a multiple-spindle automatic produced the finish you see on these electronic parts. Sunicut 102-S Cutting Oil saved time and money by eliminating the polishing operation. The same automatic uses Sunicut 102-S to machine metals ranging from titanium to stainless 410.

Sunicut 102-S is one of a full line of cutting oils known throughout metalworking for maintaining long tool life, close tolerances, and fine finishes. There's a grade of Sunicut that can help you improve your product quality
—and that's the best economy of all.

To choose the right Sunicut, ask the Sun man; that's part of his service to you. Or write to Sun Oil Company. Dept. MT-11, Philadelphia 3, Pa. In Canada: Sun Oil Company Limited, Toronto and Montreal.





MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES

# Cut Set-up Time with GLENCO Floating Tool Holders



GLENCO automatically corrects all erors within  $\frac{1}{32}$  radius or  $\frac{1}{16}$  diameter. It insures precision work without time-consuming adjustments on Hand and Automatic Screw Machines, Garvin and all other type Tapping Machines, Multiple Spindles and all types of Drilling Machines.

#### 8 Standard Stock Sizes with Taper or Straight Shanks

Any stock size sent for your inspection and test for 30 days, subject to return if unsatisfactory.

THE J. C. G L E N Z E R CO. Inc.

1546 E. NINE MILE ROAD, FERNDALE, DETROIT 20, MICH.



#### At American Bosch this **BAKER** boosted production 300%

The greater speed and ease of operation of the BAKER has given a 300% increase in the production of delivery valve holders, according to American Bosch Division, Springfield, Massachusetts. This leading manufacturer of Diesel fuel injection systems bought the BAKER AUTOMATIC BAR MACHINES two years ago as replacements for manual machines.

"With a manual machine," reports the foreman in charge, "the operator had to change gears to increase or decrease the rpm. The job took ten minutes. With the BAKER, he merely turns a dial. The BAKER, running three shifts, paid for itself in one year."

The former manual machines required an operator for each. Now, one man operates five BAKER machines.

For details on how BAKER AUTOMATIC BAR MACHINES can increase production and cut costs in your plant, write BAKER BROTHERS, INC., DEPT. MTB-1159, 1000 POST STREET, TOLEDO 10, OHIO.



BAKER AUTOMATIC BAR MACHINE producing delivery valve holders at American Bosch Division, Springfield, Mass. Machine maintains tolerance of .0005 with AISI 8620 steel in long runs.



BAR MACHINES

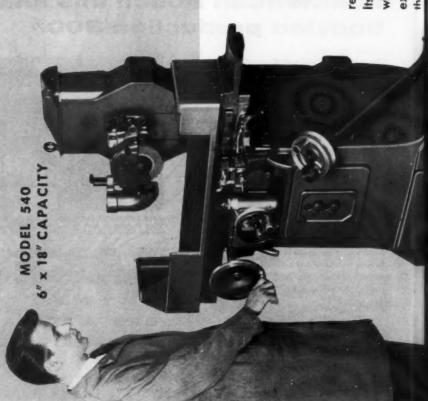
STANDARD AND SPECIAL DRILLING AND TAPPING MACHINES . COMPRESSION MOLDING MACHINES

Use postpoid card, Circle No. 263

November, 1959

63

# HYDRAULIC SURFACE GRINDER





# ACCURACY...

# EFFICIENCY ...

EASE OF OPERATION

This machine has all the essential qualities required to provide high caliber surface grinding. Its simplicity of design provides ease of operation while inherent accuracy and efficiency assure excellent grinding performance. Thousands of these grinders have been purchased by discerning



in spunsoon

# FEATURES:

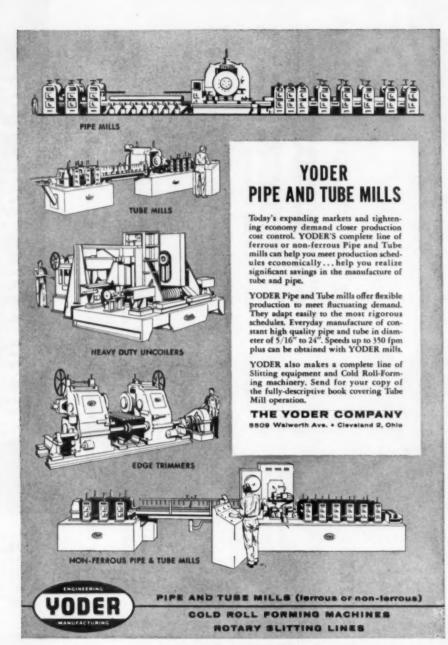
- Completely centralized controls within easy reach of
- low-pressure, long-life Hydraulic System operating from self-contained motor-driven pump unit. Patented
- Table traverse rates variable from 5' to 40' per minute. Smooth and shockless reversing at maximum speeds.
- Cross-feed automatically variable from .01 in. to .07 in.
- Hand controls provided for both traverse and cross-feed. Micrometer adjustment to cross-feed in .0001 in. divisions.
- Vertical adjustment of wheelhead controlled by conveniently placed handwheel having a micrometer knob adjustment in .0001 in. divisions.
- Wheelhead slide operates on ball bearing rollers running on precision ground bars providing absolute sensitivity of vertical feed.

Automatic vertical wheelhead feed and electric lift can be fitted to standard machine as an extra feature. Also, numerous other attachments including form tool grinding equipment are available to assure full versatility.

FOR FURTHER INFORMATION, WRITE FOR YOUR COPY OF BULLETIN C183.



# MICROMATIC HONE CORP. 8100 SCHOOLCRAFT AVENUE . DETROIT 38, MICHIGAN





This new Barnesdril. No. 244 Honing Machine represents a completely new design in honing equipment, including many added features for increased efficiency and flexibility.

Most noteworthy advantages is the new electric hone expansion which provides infinitely adjustable hone feeds with remote honing tool adjustment. This system eliminates all tubes and rectifiers usually found with electronic controls. Less headroom is needed because the cylinders are housed with the column. The external electric cabinet has been removed and electric controls have been built-into two side panels on either side of the column. Set-up controls are protected by lock and key, With a new accurate reversal stroke, the machine short-strokes at any point in the bore, and is suited particularly for honing ported bores.

Get full details on this new honing machine from your local BarnesdriL representative, or write for new bulletin No. 550.

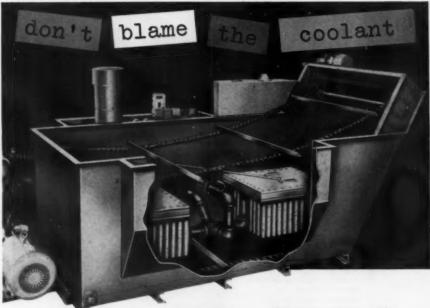


New also in the Barnesdril line is the Model No. 10 Honing Machine, for fast, economical finishing of bores  $\frac{1}{4}$ " to  $\frac{1}{2}$ ". This machine may also be fully automated for fully automatic production lines.



#### BARNES DRILL CO.

BB2 CHESTNUT STREET . ROCKFORD, ILLINOIS DETROIT OFFICE: 13121 Publican Avenue



assure longer life, better quality with

## **Delpark**

FILTER-MATIC

If dirty coolant is fouling up your work, the CFC Delpark Filter-Matic may be the simple remedy.

Delpark Filter-Matic keeps coolants clean, protects both machine tools and process work. You save money through longer coolant life.

CFC Delpark Filter-Matic gives constant

racuum filtration of coolants, cutting oils, rolling oils, solvents and other fluids. Dual manifold design allows uninterrupted filtration — one manifold on filtering cycle while the other is on backwash or cleaning. Pre-coat filter aids may be used to give absolute filtration.

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MICRO-CLARITY AT MINIMUM COST



with genuine Honeycomb Pilter Tubes for controlled microclarity of industrial fluids.



Soloctive filtration of oils • water-oil separators • magnetic separators • pre-coal filters • coalant clarifiers • automatic tubular conveyors.

Heavy Duty Vertical Milling Attachment



Heavy Duty Offset Vertical Milling Attachment



Universal Milling Attachment



Toolmakers Overarm

Send coupon for FREE Comparison Chart and detailed descriptive literature on easy-to-use attachments.

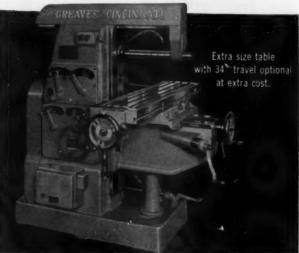
## Heavy duty attachments increase versatility of dependable, low-cost

# GREAVES MILLS

"THE MOST MILL FOR THE LEAST MONEY"

A full line of attachments and accessories offer outstanding flexibility for all types of milling operations . . . with GREAVES MILLS.

Make your own comparison of 22 specifications of Greaves and 7 other leading milling machines.



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Send Comparison Chart. I will make my own comparison of GREAVES MILLS with other makes.

Send information on Attachments and Accessories for GREAVES MILLS.

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ADDRESS	

# TRIPLE THE USEFULNESS OF YOUR M&M KEYSEATER AND VERTICAL CUTTING MACHINE

Simple modification greatly increases productive capacity of this versatile machine.

An M & M Hydraulic Keyseater is not only a keyseater that cuts internal keyways up to 5" wide but a vertical cutting machine as well. Serrations, grooves, teeth—a wide variety of cuts can be rapidly made on this machine with only one simple modification - a work-holding table. This table is now available at moderate cost. If you now own an M & M Hydraulic Keyseater or are considering the purchase of a new keyseater Cuts internal it will pay you to get the facts. Write keyways for Bulletin 19 entitled, "Converting the M & M Keyseater into a combination Keyseater and Vertical **Eutting Machine".** Cuts internal forms or shapes Cuts grooves and serrations

M&M KEYSEATERS

Cuts any shapes

## AND VERTICAL CUTTING MACHINES

MITTS & MERRILL . 1015 S. Water St. . SAGINAW, MICHIGAN





Automatic air-operated bar stock feed. Capacities to 3%" dia., 25' length. Complete with adjustable stands.



Pre-Cor AIR-OPERATED COLLET CLOSER For 10" to 18" lathes. Cuts fatigue, increases production.



Pre-Cor DIVIDING HEADS
For universal use of mills and tool grinders. Three sizes: 6½ " swing (11" w/risers), and 10" swing.

For complete information and prices, write:



PRECISION PROCESSING COMPANY

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20" Drill Presses, 28 Models



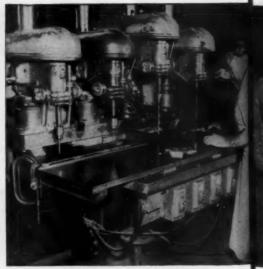
11" Metal Lathes, also 10" (4' and 5' Bed)

ON ANY SIZE JOB

# DELTA INDUSTRIAL TOOLS



Cut-off Machines, Wet & Dry Abrasive, Non-Ferrous and Wood



17" Drill Presses, 76 Models



20" Band Saws, also 14"

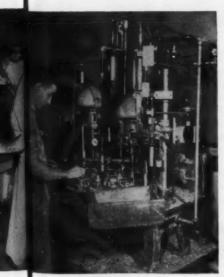


Toolmaker® Grinders, also 6" and 7"



Hand Screw Machines

# PAY THEIR OWN WAY



14" Drill Presses, also 14" Super-Hi Sensitive and 15"

You'll save money three ways when you put Delta Tools to work in your shop: they cost less to buy, less to operate, and less to maintain. They're ruggedly built to withstand hard wear, yet are completely mobile—offer you precision to meet the most exacting requirements.

And versatile Delta Tools can be "teamed-up" with standard automatic control devices to provide really "lo-cost" automation. Now any size plant can have the benefits of automation at a fraction of the usual investment.

Write for FREE Delta Industrial Catalog. Rockwell Manufacturing Company, Delta Power Tool Division,610L N.Lexington Ave., Pittsburgh 8, Pa.

See Delta Industrial Tools at your nearest Delta Dealer ... he's listed under "TOOLS" in the Yellow Pages.
"Visit Delta in booth No. 1842 at the National Metal Exposition"

DELTA INDUSTRIAL TOOLS

another fine product by

ROCKWELL

## NOW...index tables

FOR MORE
ECONOMICAL
PRODUCTION
ON THESE NEW

## HANNIFIN

"FD" PRESSES

Heavy-duty open-gap production presses with Hannifin hydraulic index tables...

Available in all of these sizes:

2, 3, 4, 5 and 6-ton bench models 6, 8, 10, 12 and 15-ton floor models



#### WITH THESE FEATURES...

Dual Safety Hand Lever Controls
Dual Electric Push-Button Controls
Adjustable Stroke Control
Reverse on Pressure or Distance
Full Automatic Cycling
Hannifin High Speed Hydraulic Index Tables
Reciprocating Hydraulic Slide Feeds

#### USE THEM FOR ...

Assembly Operations
Riveting — Staking
Forming — Stamping
Trimming Die Castings
Trimming Plastics
Molding Semi-Conductors
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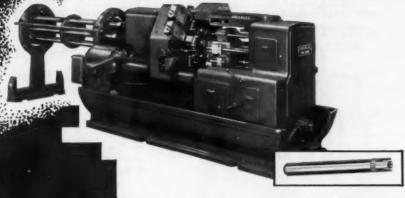
Call in your nearby Hannifin man—he's a trained production analyst—to prove how you can do more at lower cost with Hannifin presses. Or, write for our new Bulletin 132. It tells the whole story.

#### **HANNIFIN COMPANY**

529 South Wolf Road . Des Plaines, Illinois

- A DIVISION OF PARKER-HANNIFIN CORPORATION





Eliminates second operations on parts like these



Mill slots or flats on small diameter parts in one operation on Greenlee Automatics. Greenlee milling attachments often eliminate costly second operations

on parts of this type. For example...slots on the part in the inset photo were milled during the machining cycle with two milling attachments on a Greenlee Automatic. Ask your Greenlee Representative to explain this and other ways you can beat rising production costs with Greenlee Automatics.







GREENLEE BROS. & CO. 1751 MASON AVENUE ROCKFORD, ILLINOIS

Designed for the "Missile Age"

**GORTON** 

# ace:Master" Masterm

with exclusive combination of sustained toolroom accuracy and precision-built Trace-Master Hydraulic tracer control



3 Models Available (1) 180° Vertical Hydraulic Feed to Knee (2) 360° Cross Hydraulic Feed to Ram and Longitudinal Hydraulic Feed to Table (3) 3D Hydraulic feed to knee, ram and table for 3-dimensional work. Trace-Master controls can be furnished with the Model 1-22 Mastermil illustrated above or the Model 9-J Super-Speed Vertical Mill with single spindle, twin spindles and/or six inch higher column for additional vertical capacity.

## Nowhere Else will you find this combination

- 1. TWO H.P. spindle motor
- 2. Finest Milling Head in its
- 3. 80 to 5,600 RPM spindle
- 4. Rigidity . . . (2,800 lbs net
- 5. Extra long saddle

## Nowhere Else will you find this versatility

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- 2. Scanning
- 3. Duplicating . . . die and mold work
- 4. Milling . . . conventional and climb
- 5. Boring

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2771-1404





GEORGE GORTON MACHINE CO.

1404 RACINE STREET

RACINE WISCONSIN

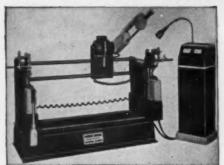
Tracer-Controlled Pantographs, Duplicators — standard and special ... Herizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

A8-1007-1PA

# HOW! The most versatile, precision

# **DYNAMIC BALANCERS**

... At Lowest Cost!



# THE NEW STEWART-WARNER ELECTRONIC INDUSTRIAL BALANCERS

- 4 models for use in single-piece, shortrun or long-run production quantities.
- Set-up time less than 2 minutes!
- For balancing a wide range of work on same machine — with no special tooling, coupling devices or accessories needed to change jobs!

Balancing a carbide tipped tongue and groove cutter-head



Only the Stewart-Warner Balancers
Offer These Maximum and Minimum Ranges:

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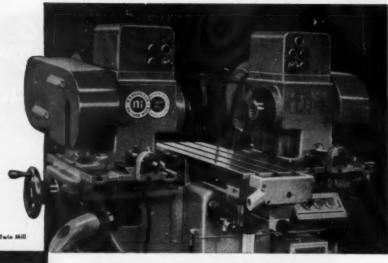
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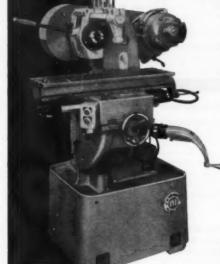
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November, 1959

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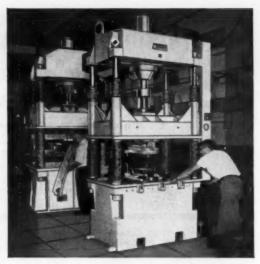
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# features in this issue



- CREATIVE ENGINEERING—Harry Conn presents some much needed information to enable you to compute power requirements for tapping and threading. The necessary steps for a process engineer to take before presenting to management his selection of machine tools are outlined by Russ Bearss. Paul Prikos continues with his die estimating series with an analysis of a pierce and blank die. Dennis G. Jones points out why the combined properties of carbide are unique as a cutting tool and other structural and mechanical applications. Pages 89 to 102
- chipless machining—Floturning is a method of metalworking that is accomplished by squeezing or flowing metal over a revolving mandrel with high pressure rollers which are tracer-controlled to follow the required contour. Much of the publicity on this process has centered around the glamour uses of it for producing missile and rocket parts. This article, however, concentrates on the latest developments of the process and what it means to the plant producing boilers, tanks, pots and pans.
- industrial relations—To make an educational program realistic and lasting consider a simple gimmick such as the "economics puzzle" described by H. R. Nissley in this article. ....Page 117
- PRE-RELEASE REVIEW—An informal meeting between product design and manufacturing engineers to review a product before it is released for production has many advantages. Problems can be discussed and resolved for the practical manufacture of the product to meet the requirements of both teams. Page 127

# Two DAKE DIE TRYOUT PRESSES in Custom Die Shop?



Greenville Tool & Die Company, Greenville, Michigan, purchased a 150-ton Dake Hydraulic Die Tryout Press to relieve the workload on their mechanical facilities. After delivery, management discovered that the backlog of work for the Dake press was far greater than it was for the mechanical presses. Its smooth, accurate operation enabled it to easily handle press work that would otherwise be difficult or impossible. A second Dake Hydraulic Die Tryout Press was installed because no other press could do as much work so well.

The Dake Die Tryout Presses can be stopped and reversed at any point in the stroke—diemakers can see just when and why blanks are "dragging" or "tearing," and their large daylight area allows the die to be "barbered" without removing it from the press.

At the Greenville Tool & Die Company, Dake presses are also used to align punches, "shear-in" irregularly shaped surfaces, develop blank sizes and shapes, find the right redraw depths, and even straighten heat-treated die parts. Dake Die Tryout Presses are available in 9 standard models from 25-ton to 300-ton capacity, and in custom engineered models to 600ton capacity to meet special requirements. Send for Bulletin No. 330 for specifications.

DAKE CORPORATION, 608 Robbins Road, Grand Haven, Michigan

















By William F. Schleicher
Vice President, Editorial Director
Hitchcock Publishing Co.

• They called it "Adventures in Progress," and adventure it was: technical announcements and new products, and a gay, rollicking birthday party at the Cincinnati Milling Machine Co., which celebrated 75 years of service to American industry.

While the technical developments are the big story, of which you will read much in future issues, the method of introducing the new products was, to coin a phrase, colossal. A brass band; jungle safari; a mock political rally complete with delegates, a chairman and a keynote speaker; and an air-supported bubble tent, kept the interest of 200 customers and members of the technical press at a high pitch for eight hours of plant tours and product viewing! And that's no mean trick, say we, who have wearily trudged our way over many a hard concrete floor and shuffled our feet at innumerable press parties.

The razz-ma-tazz of the birthday party, called "Adventures in Progress," which will dazzle almost 5,000 engineers and production people during its all-too-short life, has another vital significance: it proves that highly technical products can be glamorized, can be presented to technical people in a human and interesting manner. The affair took full cognizance of the rather basic fact that technical people are human and put their pants on one leg at a time! The machine tool industry, sometimes too staid, could well afford to appear in a sport shirt now and again and leave the white tie and tail in moth balls.

While the method of presenting technical products may have been gay and circus-like, no one will deny that it

never intruded upon the product presentation, which was serious, short and

to the point.

At one point, visitors boarded a turntable divided into sections, with seats for 20 people in each section. The turntable made a turn into a closed-off room where milling machines were introduced, then another turn where grinders held the stage. On the third turn drills and lathes were presented, and on the final turn everyone got off, boarded a "wagontrain" and was transported to the next point of interest.

Cincinnati's Lathe & Tool Division sponsored a safari, complete with helmets, a live parrot and a jungle river water, palms, weeds and all. Here was demonstrated a new model lathe which sells for \$512 less than its 1950

counterpart.

Along the tour visitors saw 87 individual demonstrations of machine tools in operation; more than 20 new machine tools were unveiled. In the numerical control center, reached by means of the wagon train, seven machines were operated by Acramatic numerical control systems built by the Mill.

The tour ended inside a large red and white striped "Cimasphere," a plastic bubble tent held up by interior air pressure. This was the scene of the "political convention," complete with brass band and keynote speaker. The three machines which were unveiled there naturally won the cost-cutting nominations. The three machines, of which much will be heard in the months to come, were: a completely automatic tool sharpener, a numerically controlled lathe, and a new milling machine which is

a bed type, fixed knee machine. On the latter, the knee has been eliminated and the vertical motion transferred to the spindle carrier; the saddle and table are mounted directly on the machine bed.

Keynote speaker at the "political convention" was Frederick V. Geier, chairman of the board, who had some serious and thought provoking comments which bear repeating. He said, "We are met in a solemn, fateful hour in the life of our great nation.

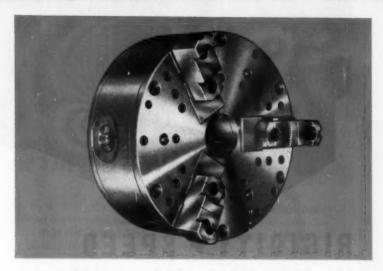
"I say a solemn hour. The great issues of these times, the anxieties and discord which beset the world, the hope of peoples for a just and lasting peace, the swift advance of science and the conquest of space, the amazing industrial progress of Europe, risen from the ashes of war, the waning of American exports and the growth of industrial imports into our United States home market, coincident with the persistent inflation of American prime costs, with its impact on the standard of living and on the very defense and survival of the nation-all these challenge the leadership of our statesmen and of our industries as well.

"At the core of these crucial problems lie two axioms . . . 1. The United States dare not lag in the swift advance of science technology and industry . . . 2. excessive costs can put the monetary price of survival be-

vond our nation's reach."

And so, on a solemn note, the Adventure in Progress came to a close, a tribute to technical excellence, magnificently presented, and in itself a tribute to the ingenuity and effort of all the employees of the Cincinnati Milling Machine Company.

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# ENGINEERING and TOOLING



## POWER REQUIREMENTS FOR TAPPING, THREADING

■ In a day when many machine tools are either over powered or under powered it is wise to have the necessary data for computing power requirements. Much information has been published to enable an engineer to determine power requirements for drilling, boring, turning, milling, broaching, and grinding but almost nothing for tapping and threading. This article will supply some data for tapping calculations.

Among the data and information in the previous articles was a method of converting moment of torque (lb. in.) required for tapping to horsepower (inch lbs.) This article will present a simplified method of computing horsepower requirements when the moment of torque is unknown.

To be able to calculate the exact amount of horsepower required for any tapping operation is impossible due to many variables. There is a definite relationship between the efficiency of a tap and the twisting effort required to turn it. The amount of H.P. depends upon many variables such as speed, tap design, style, material being tapped, per cent of thread, depth of thread, lubricants, hole alignment with tapping spindle, tap surface treatment, etc.

However, when certain facts and conditions are known it is possible to compute the needed horsepower required

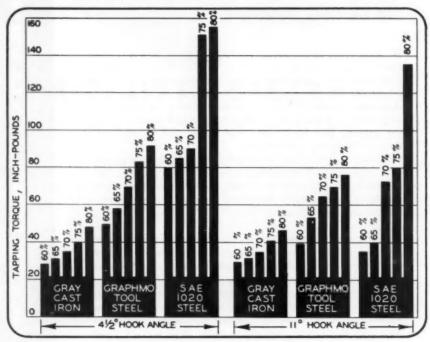
with an approximation of practical value. The four main factors are pitch power values, material, cutting speed and tool sharpness and when these are known the following method of computation is adequate.

#### 1. Pitch Power Values (PPV)

It has been assumed over a long period of time that the power for threading or tapping is constant for a given material, pitch of thread and surface speed. Based on this assumption, the following values are given for tapping Bessemer screw stock in HP./FT./MIN. units. These

HP./FT./MIN. units represent the amount of power required to cut a single 75% thread one foot long measured on its circumference, in one min.

Threads Per Inch	. HP./FT./MIN
32	0.002
24	0.004
20	0.006
18	0.007
16	0.009
13	0.012
11	0.016
10	0.020
. 0	0.020



1. Effect of Thread Depth Percentage on Tapping Torque ( $\frac{3}{8}$ —16 NC H.S.S. plug tap; tapping 9/16" stock at 60 SFM; suiphur base cutting oil.)

Courtasy Greenfield Tap & Die Co.

Multiply these values by 2.2 for double and taper pipe threads.

#### 2. Material (M)

It is a well known fact that the same size tap will require a different amount of power for various common materials. The following are power requirement factors:

Material	Power	Req.	Factor
Screw Stock		1.00	
Brass		0.63	
Aluminum		0.45	
C1117		1.05	
1020		1.10	
1335		1.27	
3140		1.37	
2330 HT		1.47	
Stainless 416		1.20	
Stainless 316		1.77	

#### 3. Cutting Speed (SFM)

The tapping speed is selected, based on the material cut.

#### 4. Tool Sharpness (TS)

In many applications, it is permissible to run tools to a dullness which doubles the power requirement. This effect should be included, because the pitch power values (PPV) are given for sharp taps. Multipliers of 1.5 to 2 should be used, assuming a satisfactory coolant is used to reduce chip welding and friction.

Formula: A reasonably close approximation of the power required can be found by using the data included herein by multiplying factors 1 x 2 x 3 x 4 or HP = (PPV) x (M) x (S/F/M) x (TS)

Example: A 1/4 tap is to be run in 1020 steel at 60 surface feet per min., with coolant.

.006 x 1.10 x 60 x 2 = .792 HP or less than one horsepower per spindle for actual cutting requirement. The product should be increased to

include a value for power safety, inertia and drive and spindle friction. Internal friction is minor in effect on single spindle applications but can be of proportions worthy of real consideration on multiple spindle tapping.

When the percent of thread is increased the amount of torque required is also increased and should be taken into consideration. By the same token when the percent is reduced the torque is also reduced. It has been known for a long time that 60 percent thread is adequate. Fig. 1 shows the effect upon torque that percent of thread reflects in cutting. These are for holes 11/2 times their diameter in depth. The torque figures for the various materials at 75 percent thread in Fig. 1 should be considered as 100 percent in our formula: HP = 1 x 2 x 3 x 4. If a thread percentage other than 75 percent is tapped, Fig. 1 shows the effect it will have upon torque. With the results of Fig. 1 you have a correction factor for multiplying times the answer in our formula.  $HP = 1 \times 2 \times 3 \times 4$ .

The effect of hook angles upon the required torque is also shown in Fig. 1. When there is a severe mis-alignment condition between tap and hole the power required may increase by 28 percent.



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# PROCESS ENGINEERING



#### PREPARING FOR MACHINE TOOL SELECTION

This series of articles is being presented for the young engineer who is entering the process engineering field. We plan to discuss the principal functions and highlight the areas that will help develop better processes in our manufacturing plants. The writer will show the relationship of the process engineer to the rest of the manufacturing function, and how management expects him to perform his function. Techniques used in process engineering will be covered in detail to give the young process engineer the advantage of tried and proven methods. Processing is too broad a field to cover in general. One phase or technique of processing will be presented each month to show the advantage or disadvantage that can be gained.

■ Machines and equipment usually represent a sizable investment and must be carefully studied and analyzed before a selection is made. Both large and small manufacturing firms expect good returns on their investments in machine tools. The responsibility for the selection falls on the process engineer's shoulders; he should be prepared to recommend to management his choice of machine and at least one alternate machine for each operation to be performed.

There are always many ways to perform a machining

#### PROCESS ENGINEERING continued

operation but the financial state of the company usually dictates the method to be used. High investment usually accompanies low labor costs and high labor costs, as a rule, go with low investments. By presenting alternate machining methods, management can select the equipment that suits their economic conditions and volume requirements.

The selection of a machining process starts with the released product drawing. These drawings are usually dimensioned from points that are important to the product, such as center lines. These reference points, as a rule, do not have any relation to the initial locating points in the first machining operation, nor do they indicate how the casting or forging is

to be cast or forged.

Most process engineers are acquainted with the problem of parting lines, clamping points and locating points. The first thing to be done with the product drawing is to make a casting or forging drawing. Some product engineers supply casting and forging drawings, but it is up to the process engineer to indicate realistic tolerances, initial locating points, qualifying areas and where he wants the parting lines. In some of the larger firms, qualified casting and forging engineers, who have experience in forge and foundry techniques, co-ordinate this work between the product engineer, casting or forging supplier and the process engineer. These engineers must work closely with the casting or forging supplier so that easting and forging drawings are compatible with the equipment located in the forge shops and foundries. They must also work with the

process engineers and quality control men so that all parties will be aware of how the castings and forgings are to be supplied.

The firm orders for the castings or forgings should be based on the casting or forging drawing, and the receiving inspection gages should be designed from these drawings.

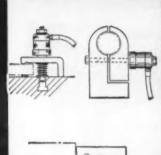
These drawings are also very important to the machine designer, because they show the initial locating points and where the parting lines will be located. Many fixtures have failed because the machine designer did not know where the parting line would be, and he located a clamp or locating pad across a flash point. When this happens, fixtures must be rebuilt or operations must be added to remove the flash. This is costly from the rebuilding standpoint. The greatest cost however, is usually scrap that is caused before the fixture is corrected and direct labor costs caused by downtime and lowered productivity.

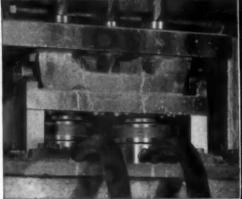
After the casting drawing is made and the machining process is developed, picture sheets should be made indicating each operation to be performed. These picture sheets should indicate the locating points, the surfaces to be machined and the tolerances to be held. The tolerances should be developed through the use of tolerance charts. The tolerance charts are the only way of making sure the manufacturing tolerance will not exceed the product drawing tolerances.

The picture sheets should indicate all the machining dimensions from the locating points in the machine; as a rule these dimensions are not the same as the product drawing. The tolerance chart is the best tool to use to make sure that the manufacturing tolerances are correct.

Upon completion of the picture sheets, the process engineer is ready to look for a machine to do the operation. He can go to his casting or forging drawing for initial locating and clamping points, and determine his casting or forging tolerance variance. His picture sheets tell him where his machining areas are, where he should locate and clamp, and what machining tolerance must be held. His tolerance chart gives him a check on his manufacturing tolerances.

This kind of preparation should be made to insure top quality from a machining process.





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DI-ACRO POWER SHEARS. Di-Acro Shears of 12" and 24" widths are available in power models. The standard model provides continuous and single stroke operation. Vari-O-Speed model shears automatically at a range of speed from 30 to 200 R.P.M. or single stroke.





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# THE PRACTICAL DIBMAKBR



#### ESTIMATING A PIERCE AND BLANK DIE

■ Pierce and Blank Dies vary widely in complexity. A blank die could range in price from \$50.00 to \$5,000.00. There are continental and push-through types that require no die set at all. There are filled-out openings with conventional strippers, both stationary and spring type. There are also blank dies elaborated with jig grinding, lapping, split sectioning entirely ground, inserted and voked.

Again I want to emphasize that the approval in these articles is "back to basics". In other words, let us select a pierce and blank die that resembles a type that we can point out readily in our own shops. After having selected an example (see Fig. 1) we will apply die making principles applicable to any pierce and blank die. Principles are not altered; only refinements and interpretations are necessary with other die examples. This technique is commonly interpreted as experience.

When analyzing a pierce and blank die the estimator is generally concerned with a variety of die constructions to produce a piece part with tolerance and with minimum die maintenance. Suppose the part is about two inches long and one or two inches at its widest point, something like Fig. 1. We try to weigh and consider the following points before arriving at an estimate:

1. Feeding problem-French stop and/or pilots.

#### PRACTICAL DIEMAKER continued

- 2. Dishing of blanked part.
- 3. Slug problem.
- 4. Notching.
- 5. Stationary or spring stripper.

The estimator's selection of the five enumerated points will determine the eventual die costs. Perhaps we could have a choice of selection for point

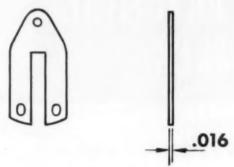


Fig. 1. The piece part.

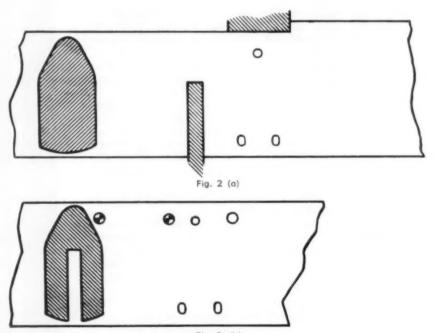


Fig. 2. (b)

No. 5 that would be equally good insofar as a piece part is concerned. However, a spring stripper is more expensive than a stationary one Then again, the punch press operator can more readily observe the material going through the die with a spring stripper. Here it is a matter of customer choice; in a manufacturing plant, what the tool room supervisor feels the press room is most used to doing will govern the selection.

Applying a few principles to a pierce and blank die we will find the following elements common to all:

(a) Die block

(b) Punch and perforator

(c) Punch pad(d) Stripper

(e) Guide rails for strip stock

(f) Pilots or French stop

(g) Die set in 90% of dies built In the case of Figure 1 we will also supply a simple strip layout to show two approaches to the pierce and blank die. See Fig. 2, a and b.

Estimating analysis for strip lay-

out "a":

Die block-generally no important openings . . . . 5.0
 Holes too oblong and are

void in the die block including their perfs . . . . 25.0 (3) Notch opening and the

(3) Notch opening and the notch punch . . . . . . . . . 10.0
(4) Blank contour opening and

the punch . . . . . . . . . . . . . . . . . 30.0
(5) French stop opening and the respective punch . . . . . 10.0

TOTALS 130.0

The answer in dollars is as follows: (die set, steel and other

material) . . . . . . . . \$ 125.00 Build

130 hours @ \$7.00 . . . . 910.00

\$1,050.00

Estimating analysis for strip layout "b":

Same as layout "a" except for the consideration of the blank opening. The piloting method is equal in hours to the French stop cost. However, the blank opening would require an insert that would cost more than the rectangular notch or separator in layout "a". My estimate is that the additional work would require 12 more hours or \$84.00 extra. Therefore layout "b" would cost \$1,135.00 (rounding out the extra dollars).

Remember the type of die we are estimating is a good running acceptable die according to general die making practice, embodying all good die making principles with oil pins in notching and blanking punches, proper clearance, proper thickness, die blocks, etc., except that jig grind-

Carter

ing is not required.

# • GUIDES • TIRES

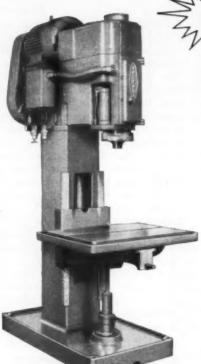
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# CUTTING TOOLS



## COMBINED PROPERTIES OF CARBIDE ARE UNUSUAL

■ What is frequently termed as "a recent development" might more aptly be described as a "known principle applied." The basic development may have occurred years ago, but is just now being recognized and successfully applied.

What we are attempting to say is: "You are in the future"—or "To look ahead, just look about!" Many of the things you need are here.

An example of this is demonstrated in the recent recognition of the mechanical and physical properties of cemented carbides. Certainly these carbides are not recent developments nor have their properties recently been added! They were always there, but we had to wait 20 years or more, until they were "discovered."

Carbide is unique not only because it is the key element in the metal cutting industries but because it also possesses engineering characteristics unavailable in any other material. These characteristics, although not as distinctly recognized in cutting tools as they are in mechanical applications, do nevertheless play a vital part in making carbide the backbone of the chip-making business.

The mechanically-held, insert type tools which have come into prominence in the last five years, appear in the simplest form to be three pieces of carbide integrated into a cutting tool. The three parts are the shim of seating surface, the cutting insert and the chip breaker. Grade identification of cutting inserts is common but little thought is given to what properties are required for shims and chip breakers.

Shims must be made of a composition that has high compressive strength, moderate hardness, excellent resistance to thermal deformation which, of course, means dimensional stability and good transverse rupture srength. The chip breaker must also have good strength, moderate hardness, resistance to thermal deformation and most important of all, high anti-galling and crater-wear properties. Only in carbide compositions can all of these necessary properties be found.

More distinctive than these properties, however, are those which are applied not only in metal cutting but in many other industries. Carbides have long been recognized as having outstanding wear resistance, high hardness, excellent corrosion resistance, high temperature resistance plus a wide range of densities as may be required. But of all properties of carbides, perhaps the most intriquing is the extremely high Young's Modulus of Elasticity. Y.M.E. values exceeding 95,000,000 psi are obtainable. This value is more than three times that of steel and even double that of the so-called high modulus materials. A modulus three times that of steel means conversely one-third as much deflection under a given load. Since deflection results from stress and, as every mechanical element is under either static or dynamic stress, the potential for the utilization of this property is virtually limitless.

In metal cutting the most widespread application of this property has been in boring bars. Not unlike boring bars in their function, internal grinding quills are also being made to utilize the phenomenal modulus of tungsten hard carbide alloys.

On many boring operations, where the use of conventional boring bars has been found laborious, time consuming and costly, better results are being obtained at less cost by utilizizing the high Y.M.E. of solid carbide bars. Chatter, taper and bellmouthing are virtually eliminated. Fewer cuts are required to produce better finishes and closer tolerances

Likewise, where carbide internal grinding quills have been applied, wheel consumption has been reduced as much as one-half and the production rate doubled in many instances. In addition, better finishes and closer tolerances are obtained to improve quality and greatly reduce scrap.

The number of applications of the unique properties of carbide is, of course, small if limited exclusively to metal cutting. However many other structural and mechanical applications of carbide have been made that have proven equally astonishing.

The combined properties of carbide are unusual. No other material can meet all the requirements frequently demanded by modern technology. This is truly an engineering material of the future, that is here today!





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Bill Busch points to preformed blank of 3/6" 6061T4 which will be Floturned into a 23" missile nose cone of .080" wall thickness.

From missiles to pots and pans . . .

# FLOTURNING

produces stronger, more accurate parts faster

By Darrell Ward, Engineering Editor



■ One chipless machining process gaining in stature combines two basic metalworking techniques: sheet metal spinning and heavy metal extruding. It consolidates the flow-shaping principle of spinning on a lathe with high-pressure flowing of metal in an extrusion process. Each machine builder has his own name for it. One may be as good as another. Lodge &

Shipley call the new process Floturning.

Floturning is not really new since it dates back to the early thirties from a Swedish development held under German patents. It was first made available to American customers by a Swedish-backed concern, Steelex of Brooklyn. Lodge & Shipley's President William L. Dolle saw

trends toward chipless machining when industry was settling down after World War II. He became acquainted with the then new method of forming parts, saw that this would be healthy diversification for the company, and brought in Claus L. Sporck of the Brooklyn concern to take over as vice president in charge of the Floturn Division.

Sporck's job was to head up the design, research, development and furtherance of the Swedish process for all of American industry. Under Sporck, Floturn Division Manager William H. Busch is right on top of developments in the shop and current problems being solved for various customers. Bill Busch is the man we interviewed to find out just how significant this Floturning process, now in use since 1954 on American-built machines, can be to over-all industry.

In the middle and late forties, Floturning was used to produce the then popular metal TV picture tubes and such utensils as mixing bowls, pails, cocktail shakers and other products of stainless steel. Floturning was an easy way to overcome common problems in spin-turning stainless. And, it produced a more precise tolerance and better finish than drawing.

But, Floturning is not quite as simple in principle as it would seem from some of the rather commonplace parts it can produce. Bill Busch pointed out that everything revolves around "Lindgren's Formula." Floturning is accomplished by squeezing or flowing thick metal over a revolving mandrel with high-pressure rollers which are tracercontrolled to follow the required contour. Lindgren's Formula states that finished wall thickness (T<sub>1</sub>) equals

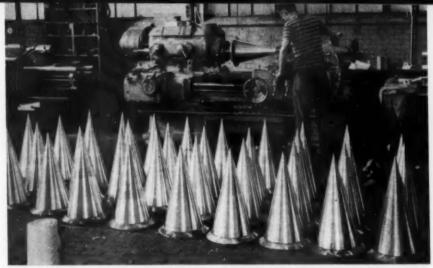
flat blank thickness (T) times the sine of one-half the included cone angle, OC.

This function provides definite advantages for precision production if it is well understood and applied, but it must be taken into consideration to avoid serious problems in changing contours, Mr. Busch explained.

The tail cone for the Boeing 707 engines, for example, requires a constant wall thickness over a contoured section. This cannot be Floturned directly to shape from a flat blank because, following Lindgren's Formula, as the contour changes from a relatively blunt nose angle back toward a more cylindrical shape, the wall thickness would grow thinner until at some point, the metal would be sheared off the form.

The part is made in two steps. First, a blank is drawn to a shallow dish shape in a rubber bag press, then Floturned to final shape. As the flaring dish shape is flowed back along the mandrel, the angle of incidence remains constant and, therefore, the wall thickness is maintained.

Mr. Busch uses this example to illustrate the advantage of consolidating different forming methods with Floturning. One does not obtain best utilization of the Floturning principle as a single production process from blank to finished part. More efficient use comes from intelligent combinations of processes. An example is a flat blank which is Floturned into a cone. The cone is drawn into a fat cylinder, then, the cylinder is again Floturned into a much longer, thinner walled cylinder. These three operations, with two anneals, replace from seven to ten drawing



Missile nose cone requires trimming of flange and nose on a lathe.

operations with five or six anneals.

It has been found that about 75% reduction in stock thickness is maximum for one pass in Floturning. It is evident that more efficient use of the process can be had in conjunction with other methods of forming, particularly with material like 0.500" titanium plate which is to be brought down to a conical or cylindrical shape with a wall thickness of 0.040".

Many current developments involve materials not even known six or more years ago: Vascojet 1000, Rene 41, Peerless 56, H-11, and high alloy tool steels used for missile cases.

Close tolerances and unusual shapes, inconceivable six to ten years ago, are now found in standard specifications. Some missile skin thicknesses, for example, are held at 0.100"  $\pm$  0.003" in diameters up to 30" or 40". Small cylindrical parts of 0.0075" shell thickness are held  $\pm$  0.001"; others with the same tolerance on a 0.025" wall thickness in tubing 3" dia. x 40" long while I.D.

Tooling setup for Floturning shows fine finish of mandrel which is imparted to I.D, of parts made on this machine.



tolerance is maintained at ± 0.002". Such tubing as this cannot be purchased in either drawn or seamless stock within these tolerances. The fact is, no one has yet suggested how precision tubing of this kind could be produced—except by a method like

Floturning.

The outer spike of the Convair B-58 engine is a variable shape changing from a cone-shaped nose to a cylindrical section at the rear. Specifications call for wall thickness of 0.080" at the nose, 0.030" in the cone, and 0.040" in the cylinder body. There can be no welding. By Floturning, however, this part is made to specifications with a tolerance of ± 0.010" on a 21" dia. and 38" length.

Floturning is not a process limited to the "Science Fiction" industries or to glamour metals. Bill Busch said it is even more significant to the production plants which make everyday necessities. Typical products which can benefit from the Floturning principle would be down-to-earth items like fire extinguishers, stainless tanks for soft drink containers and dispensers, cylindrical air filters, and various utensil and equipment items in the hospital equipment line.

Specific benefits derived from Floturning these articles instead of producing them by other methods is that parts or components can be made lighter and stronger, as well as faster and more economically. Greater precision and uniformity of parts improves interchangeability of many items. And, improvement in quality to meet health code regulations comes from seamless construction with rounded contours and finer finishes

in contact with food or medicines.

Power requirements are less, because pressures required to Floturn a blank into a cone and cones into cylinders range approximately 50% less than normal drawing pressures for similar parts, materials and shapes.

This can be added to other advantages such as fine, micro-inch finishes direct from forming without further grinding or polishing in many instances; closer tolerances held in I.D., O.D. and wall thickness; less expensive forms to replace high-cost die sets; and higher rate of production on complex shapes, some of which could not be produced by other standard methods.

Bill Busch thinks that an important use of Floturning in the future will be in production of industrial parts and components such as accumulators for refrigeration equipment, air brake system components, transformer casings, pump parts and components, and most certainly in the immediate future, copper coated stainless steel kitchen utensils.

The latter can be Floturned easily without flaking, peeling, or mushing the copper, whether the base metal is coated inside, outside, or both.

In electronics, Mr. Busch sees good uses of Floturning in close tolerance tubular parts of molybdenum allow with ½% titanium, and precious metal-coated parts which require plating or filling with platinum, gold, or silver prior to forming.

Lodge & Shipley have already been Floturning for the silversmith industry on sterling silver table service. The process produces direct finishes of 10 to 15 RMS on the O.D. and twice as fine on the I.D. This is im-

# Process of Floturn and Reform

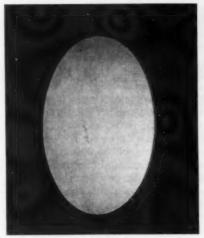


FIGURE A



FIGURE B



FIGURE C



FIGURE D

Parts in process of Floturn and reform in this case start with flat blank (A) which is Floturned into cone (B). Cone is drawn into cylinder (D) which may be the final shape or a preformed shape to be Floturned further into a smaller and longer cylinder. Part at (C) shows cone only partially drawn into cylindrical shape and removed for illustration.

#### FLOTURNING continued

portant to silversmiths who find their most difficult problems in buffing and polishing internal surfaces. With Floturning, the I.D. of sterling silver objects usually needs no further processing after it leaves the mandrel.

Reflectors for the lighting industry can be made more precisely and more economically by Floturning according to Bill Busch. The process can be used to develop the precision contours required for optical formula shapes like parabolic focusing reflectors, with or without special coatings on the base metal.

A big problem with manufacturers of deep section cylindrical parts is the elimination of welding and the production of closer tolerances in tanks for hydraulic or gaseous pressure applications. Utility equipment manufacturers can Floturn heat exchanger tubing and other items of thinner material which, by nature of its mechanical structure or allovs, can withstand higher pressures and give more efficient heat exchange than is possible with standard tubing.

Welding gas tanks, hospital oxygen tanks, and various industrial tanks or cylinders can be Floturned to make stronger, safer, lighter and more economical units.

Lodge & Shipley are producing components for photographic and graphic arts equipment in the form of 15" dia. aluminum drums up to 30" deep by Floturning to close tolerance specifications. Finish is improved to better than a 5 to 6 RMS by taking a subsequent fine cut with a diamond tool while the part is still held on the arbor. This production is a multiple process operation in a single machine. Other functions may event-

ually be consolidated to make a Floturn machine as versatile as a tracercontrolled turret lathe.

The ability to repeat parts of uniform size, shape and tolerance on large production runs is another feature. One customer, using the No. 12 vertical machine for Floturning precision piece parts operates 22 hours a day, six days a week. They reported a recent run of 38,000 parts without scrap. On another run of 32,000 pieces, only 50 parts were scrapped; half of these were the result of material defects.

The process of Floturning, itself, becomes an automatic materials inspection aid since any inclusion or imperfection in the basic metal will become immediately apparent when the blank is substantially reduced in thickness. Therefore, electronic or X-ray inspection can be eliminated when there is as much as a 50% reduction of thickness in forming.

A diamond tool cut is taken on a photographic drum to produce a mirror finish before part is removed from Floturn machine.



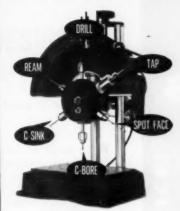
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#### CASE HISTORIES --



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■ In small lot machining of castings, particularly those for internal combustion engines and hydraulic equipment, the radial drilling machine is one of the principal machine tools used. Many small shops will swing heavy castings on a lathe face plate in order to turn seatings and the like. However, it is more economical to make up suitable cutting tools for attachment to the drill spindle. With these, a casting can be finish machined on the drilling machine, eliminating the heavy handling costs which would arise from setting up in a lathe.

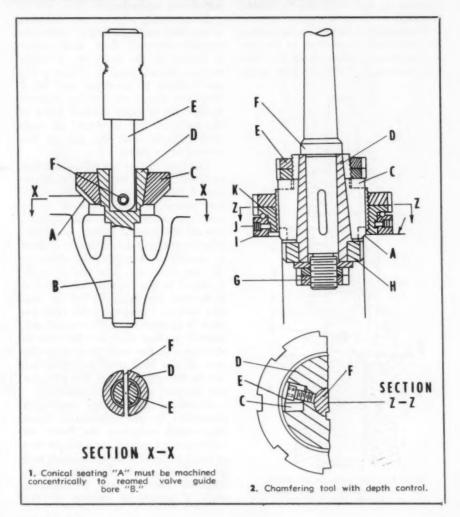
A typical surfacing operation is illustrated in Fig. 1, in which the conical seating A must be machined concentrically to the reamed valve guide bore B. The conical seating tool C is of solid form with cutting edges milled into the angular edge. It is locked to the guide portion D of the tool by a self-locking taper which is one of the simplest and most compact means of locking a pair of parts together.

The guide has a pilot at its lower end for engagement with the previously reamed bore; the guide length is sufficient to ensure the chamfered edge of the seating being concentric to the guide bore.

In a tool of this type, the drilling machine spindle must exert a purely torsional movement without any lateral pressure and to accomplish this, the driver E attached to the quick change chuck on the drill spindle, has floating connection with the tool. The lower end of the driver is drilled diametrally to take the cross pin F. The hole in the driver E is bell-mouthed from each end (Section Z-Z) so that there is substantially line contact between it and the cross pin.

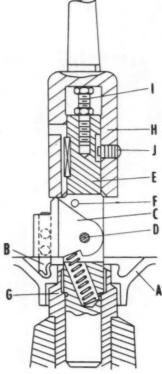
On the tool shown in Fig. 1, no provision is made

# **CHAMFERING TOOL DESIGNS**



for controlling positively the depth of the conical seating. On a radial drill, this can often be controlled by using the dial and pointer provided on the spindle hand feed control. In Fig. 2 is shown a design of chamfering tool with depth control provided.

The seating A in this example must be positioned in relation to the upper machined surface B of the casting; concentricity with the bore in the



3. Turning tool produces an undercut curve in casting "A" by means of a pivoted form tool, "B".

casting is of secondary importance. The actual cutter is of the inserted blade type and is so made because the diameter machined can be 6 in. or more. The inserted blade construction also allows for cutting edge maintenance and replacement.

Four cutting edges C are mounted in the tool body D, being located in radially disposed slots; each cutter is locked in the body by a single wedge shaped plug É. These plugs are cheaper to construct and fit if they are made of circular tapered form to fit in taper reamed holes in the body. A flat machined on each plug engages with the side of the cutting edge insert.

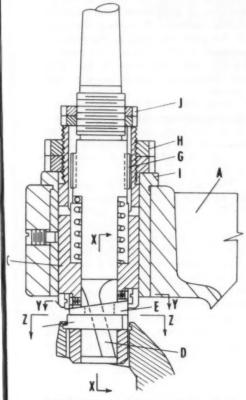
The four blades are retained longitudinally in the body by the upper nuts E which resist the tendency for the blades to push upward under cutting pressure. The maximum diameter of the conical seating is adjustable; by pushing the blades downward by means of the nuts, the diameter can be increased. The tool body D is keved to the central shank F and is secured longitudinally by the bottom nuts G. These nuts also hold the pilot H in position and are made adjustable so that the pilot can remain stationary in the work bore while the rest of the tool revolves. Slots are cut in the periphery of the pilot for the purpose of swarf clearance.

Depth of the conical seating is controlled by the adjustable depth stop which comprises the freely revolving ring I, which has a simple ring of balls to form a thrust bearing and is retained axially by the radially disposed screwed pins J, engaging with a peripheral groove in the

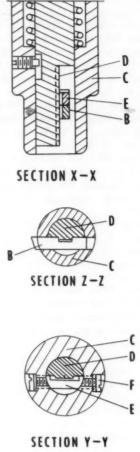
screwed ring K. Depth adjustment is obtained by screwing the ring I up or down the threaded exterior of the tool body and locking it in place by means of the upper nut.

A more complicated form of turning tool is illustrated in Fig. 3. This is used to produce an undercut curve in the casting A by means of the pivoted form tool B. The form tool is gripped in a holder C which pivots

on the horizontal pin D and is supported sideways in the diametral slot through the tool bar E. When fed down into the work, the tool holder is pushed upward by means of the compression spring and is bearing on the stop pin F. In this position the cutting edge is clear of the work. Continued down-feeding of the drill spindle brings the lower shoulder on the tool bar E into contact with the



4. Tool bit has angularly disposed groove machined in one side. This engages with the angular tongue on central push rod "D". Downward motion of "D" results in horizontal motion of tool bit into work bore.



guide bushing G, which arrests further movement. Further down-feeding of the drill spindle causes the outer sleeve H to push downward the tool holder so that the cutting tool feeds into the work with an arcuate movement.

The diameters in the work which are swept out by the cutting tool depend on the amount of down feed of the sleeve H. This can be controlled by adjusting the projection of the stop bolt I from the top of the tool bar. Torque is transmitted from the drill spindle through the sleeve H which is slidably connected by a key to the tool spindle. A pin J, engaging with a longitudinal slot in the tool bar prevents the parts from becoming separated when the tool is raised out of the hole.

The bottom pilot bushing G serves the dual purposes of guiding the tool bar and locating the previously machined work bore on its external diameter.

Cutting a retaining ring groove in the wall of a previously machined bore requires a horizontal movement of the grooving tool and Fig. 4, shows a form of tool which provides this movement. The tool is made to suit the drilling and reaming jig A which is also used for finishing the bores on two ends of the same forging prior to grooving.

The tool bit B is of square section and is supported in a close fitting square cornered hole machined diametrally through the tool body C. From Section Z-Z it can be seen that the tool bit has an angularly disposed groove machined in one side and this engages with the angular tongue on the central push rod D. Downward motion of the push rod brings a corresponding horizontal motion of the tool bit which is pushed into the wall of the work bore.

The angular tongue is a fairly common means for converting vertical to horizontal motion in drilling tools. An angle of 45 degrees results in similar amounts of movement both vertically and horizontally. By making the angle of the push rod tongue less than 45 degrees to the vertical, the rate of cutting tool movement is less than the downward speed of the drill spindle.

From Section Y-Y it can be seen that the sliding clearance of the tool bit in the body can be adjusted by means of the sliding wedge E which can be set and locked by means of the two end screws F.

The tool body C and the push rod D can slide axially in relation to one another and are joined together by the twin keys G. When the drill spindle is fed upward and axial pressure on the push rod is released, the compression spring surrounding the push rod forces the body down and the rod upward and thus retracts the grooving tool within the tool body.

Axial location of the groove within the work piece is controlled by the adjustable nuts H which bear on the upper surface of the jig bushing I. The diameter swept out by the tool point is controlled by the stop nuts J on the push rod. In the maximum down feed position, these bear on the upper surface of the tool body. Practical Arbitration, Time Study and Work Simplification—Part XI

# YOUR FREE ENTERPRISE STORY

How real and lasting an impression does it make?

By Harold R. Nissley, Consulting Engineer

■ About 10 years ago the National Association of Manufacturers produced an excellent 50-minute sound movie, *Three To Be Served*. I thought I saw a good use for this movie in my Work Simplification conferences and other educational programs: so I bought a print of it.

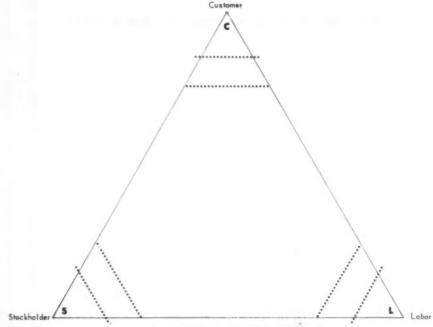
BLUE BOOK FEATURE

However, like many other visual aids that look good, I found out that this movie was more entertaining than it was impressionable. Top management thought it was an excellent film because it dramatized an old story which management has been trying to get across for years. But later when I asked supervisors, who had seen the film, a few simple questions about it, they seemed confused (and would have been sitting ducks for any union officer who might have asked the same questions).

"Should I stop using the film?" "Should I give up on trying to get across my free enterprise story during the 60 minutes I allowed myself?" The mere fact that top management liked the film did not sway me; my job was not to impress top management with the need for giving customers better bargains or giving the stockholders more dividends or giving the union more money; my job was to provide supervisors with an understanding of Management's place in the three cornered tug-o-war.

The result of my deliberations was an "Economics Puzzle" (based on a concept developed in *Three* 

To Be Served; but the concept is much older than the film and was originally set forth in a Reader's Digest article about two decades ago). At the center of a large triangle is Management (Supervisor to President). In one corner of the triangle is the Customer who is pulling at Management for more bargains (or he will shift his patronage to another supplier). In another corner of the triangle is the Stockholder who is always demanding more dividends (i.e., higher profits). In the third corner



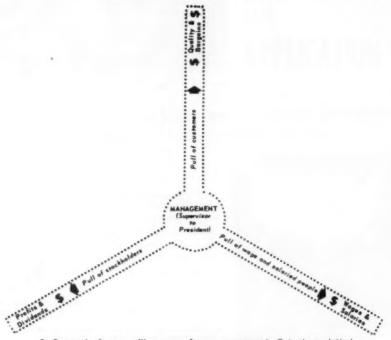
1. Basic economics triangle without management. Cut along dotted lines to fit puzzle together. Read instructions for further information.

is Labor which puts the bite on Management whenever and wherever it can. Management's job is to optimize the satisfaction to all three of these parties; if Management gives more than a fair share to one party than it deserves, one or two of the other parties suffer.

Three To Be Served plus a blackboard demonstration did not give lasting results until after the Economics Puzzle was developed. Now, whenever the subject is discussed, the puzzle is demonstrated; each member of the audience is invited to take along a puzzle (free!) to demonstrate the idea to members of his family (or to a union steward).<sup>1</sup>

In Conclusion: Is your Work Simplification or other educational program giving you the results you expect of it (or is it merely giving you a kick)? You'll never know until you test it in various

<sup>1</sup>The writer prefers this voluntary "pick-up" plan for handout material for several reasons (aside from economy of materials). One reason is it gives the writer some idea of



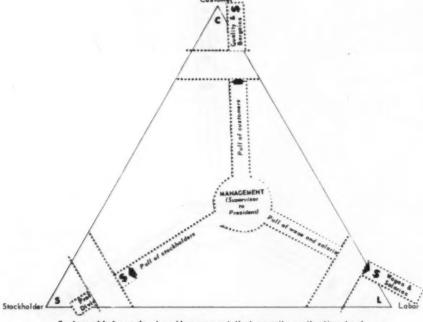
2. Economic forces pulling away from management. Cut along dotted lines and insert three legs through appropriate slits in Figure 1 (Basic Trianale).

ways. When you find a weakness in it, don't throw away an expensive film or drop the program; do give-away economics puzzle).2

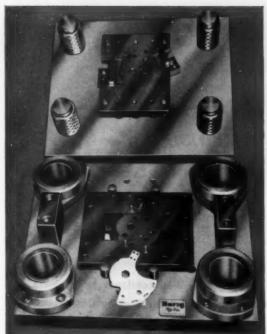
something that will make it both enjoyable and productive (e.g., a

audience interest in the whole idea (by subtracting the number of puzzles left after the meeting is over from the number that were placed on the table at the start of the meeting).

<sup>2</sup>Six inch copies of this economics puzzle on heavy paper are available (no charge), in limited quantities, to any who wish to experiment with this educational tool. Write to: Editor, MACHINE & TOOL BLUE BOOK, Wheaton, Illinois.



3. Assembled puzzle. Any Management that permits a situation to develop like the one shown in this picture "is not long for this world." By moving these economic forces around, anyone playing the role of management begins to see what happens if Labor, or Stockholders, or Customers get more than their fair share.



PART: Index Plate OPERATION: Shaving
MATERIAL: .063 C.R.S.

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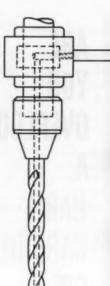
Leading manufacturers are turning to Harig Carbide Dies for forming, drawing, shaving and notching in addition to blanking and piercing applications . . . because they consistently outproduce steel dies 10-15 to 1 (fewer grinds mean reduced maintenance and set-up costs), yet cost about ½ more than steel. On long stamping runs, one Harig Carbide Die can take the place of several steel dies — at a great savings to you.

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WRITE FOR CATALOG



# Here's a fast way to drill HARD MATERIALS

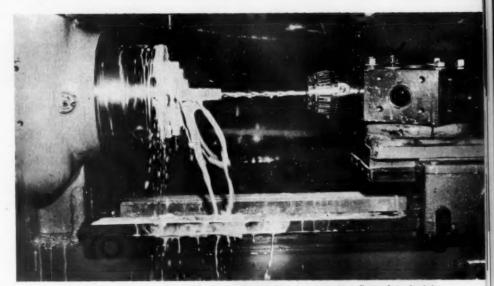
Cold Point drilling continues to solve more and more production bottlenecks

By Paul A. Meline, Managing Editor

■ With the advent of the high temperature alloys many variations of drill design have been developed and tested by drill manufacturers. One revolutionary design variation presented to Industry during the past year is the cold point drill.

Extensive drilling tests still continue at Mossberg, Inc. in Cincinnati where the cold point drill was conceived and developed by William Mossberg. Mr. Mossberg stoutly maintains there is no impossible-to-drill material and welcomes any interested party to visit his shop and see for himself.

A feature of the cold point drill is the single hollow core through which a large volume of coolant is supplied under pressure to the cutting zone. The body, incidentally, is made of 4130 Aircraft tubing, which is mill fluted. The cutting zone consists of a specially shaped carbide tip (44A or 883 Carboloy) which is brazed into a slot that has been milled in the tip.



Set-up on turret lathe shows copious flow of coolant to workpiece. Coolant transfer unit .s required for chucking the drill.

The slotted shape of the openings along the juncture of the drill and carbide tip directs a flood of coolant directly into the cutting area, causing the chips to be flushed back away from the cutting edge of the tool and into the flutes of the drill for discharge from the end of the hole.

The Cold Point method incorporates negative rake carbide tips (22 deg.) and for most work the drill point is ground with an included angle of 110 to 135 degrees. The angle of lip clearance is flat ground to 32 degrees and not rounded or contoured. With the oil hole designed so that the forced coolant straddles the carbide cutting point, the true point of the drill is being used in cutting. Thus, the drill can penetrate faster and cut with thrust instead of torque. The temperature of the drill



Set-up on drill press shows coolant transfer unit. Coolant line is installed in a hole in the arbor. Auxiliary pump and filter are used.

point stays at room temperature. The negative rake makes tiny chips, which are easily flushed out of the hole through the flutes.

The results achieved amaze most people who have visited the Mossberg plant to see materials from lucite to carborundum drilled efficiently and effectively. According to Vice Presi-



Fine chips shown between drill and 302 SS bar stock plus lock of heat make deep hole drilling no problem. Drill forms extremely fine finish.

dent Louis Doerman, the principles of the cold point drill are so simple they appear complex.

"Because of the tiny chips, we don't even have to use flutes," Mr. Doerman said. "All we do is overhang the tip far enough on the body to provide clearance between the body of the drill."

One company that was very much concerned with the drilling of four holes in the pin mount of a J-79 Turbine frame made of A-286 was using a ½-in. diameter drill, .616 core drill and a .625-in. reamer. At 140 r.p.m., the cutting speed was 17 to 21 s.f.p.m. with a feed at .004 i.p.r. (at intervals) resulting in a total production time of 3.34 hours per piece.

The report furnished by the above company when using a cold point drill for the same operation included the following data:

Cold Point Drill
R.P.M. during test
Cutting speed
Feed
Cutting speed
Cutting speed
Feed
Cutting speed
Feed
Cutting speed
Cutting

Estimated time required for 4

holes 30 minutes

Approximate reduction in time cycle
Hole size after drilling

Approximate reduction in time cycle

85%
Within
± .001-in.

The tests were conducted on an upright Cincinnati Bickford single spindle drill press.

In drilling titanium by conventional methods the basic problem has been to control the heat generated at the cutting surface. Chips curl away from the cutting edge at a sharp angle, resulting in localized stress concentration. As the temperature rises, the chips become longer and curly and chip removal becomes a problem. The low thermal conductivity of titanium adds to the heat problem and if the heat gets high enough the chips weld to the cutting edge of the tool, resulting in tool breakage.

If sharp drills are used at slow speeds with a copious flow of coolant directed at the tool contact area, and the drill is disengaged at regular intervals—approximately one-half the drill diameter—to clear the chips titanium can be drilled successfully with a conventional tool. However, from a time consumption standpoint, this becomes a costly operation.

The Titanium Division of Crucible Steel Company of America has reported on the results of drilling a 49/64-in. hole through a 3-1/4-in. section of titanium. Conventional drilling techniques would require over four minutes drilling time and this does not include the time required for withdrawal of the drill to clear the chips. In drilling tests at Mossberg, Inc., the same hole was drilled in 45 seconds with a Cold Point drill.

A firm wanted to drill graphite block dry, but didn't want the chips flying all over the area. Mossberg, Inc. was consulted on the project and decided to use a reverse process with compressed air, involving an attachment to an ordinary vacuum cleaner. Instead of blowing compressed air in the central channel of the drill, the air was drawn down the flutes in through the ports and out through the central channel of the drill into the vacuum cleaner.

#### TEST DRILLINGS

Material	Hole (inches) Diameter	Hole (inches) Depth	Drilling Time (Seconds)
Bearing Bronze	.250	3	6
Cast Iron	.4375	1	3.8
Duriron	.500	3	38
Formica (Glass Type)	.4375	1.250	3.3
303 Stainless Steel	.4375	4	42
316 Stainless Steel	.4375	3.500	47
Rex AA Tool Steel	.4375	4	62
Rex M2 Steel	.4375	4	47
4615 (62 Rc)	.4375	.500	3
Inconel	.4375	3	150
Monel-R	.4375	3	79
Ketos	.2187	4	237
M2S	.4375	4	28
Bronze	.4375	.500	3
Beryllium Bronze	.4375	3	3
Sanderson Extra (62-65 Rc)	.4375	4	61
Maxel (54-55 Rc)	.4375	3.500	69
Monel	.4375	3	150
Monel A	.4375	3	80
Cast Stellite No. 36	.1875	.500	25
"A" Nickel	.375	4	120
A-286	.4375	2	60
M-252	.4375	1.500	40
Mangaloy	.4375	2	60
440 C Stainless Steel	.375	4.100	47
3620 Steel	.375	4.250	260
1045 Steel	.375	4.750	360
52-100 Steel	.625	5.500	420
Ambraloy 917	.4375	45	60
Lucite	1.0000	.500	5

Mossberg, Inc. plans to publish information in which every metal is classified for ideal speed, feed and point geometry. With respect to the hard metals, using a conventional twist drill calls for flattening the point, increasing the included angle. With soft metals, the included angle is decreased. The point geometry when using a cold point drill is just the opposite: for soft metals they bring the slope down; there's a decrease in the included angle for hard materials. It was pointed out that while this doesn't make sense when considering the traditional use of a twist drill, the cold point drill cuts by thrust instead of by torque.

As with any tool, the Cold Point Drill must be used in a proper manner to yield best results. Its requirements are few, but each is important.

Spindle speed must be high and should be above 1500 r.p.m. although for a few materials such as Inconel it must be run at about 750 r.p.m. In general the higher the spindle speed the better the finish and penetration rate.

Feed rates must be low. Best results are obtained with feeds on the order of 0.001 i.p.r. With less exacting finish and tolerance requirements higher feeds may be used. In any case feed rates should be increased gradually.

Coolant must be water soluble oil mixed in a ratio of 10:1 and must be delivered at a line pressure in excess of 85 psi consistently.

Positive or mechanical feeds are preferable to hydraulic feeds. Since there is no danger of heat hardening due to dwell periods, hand feeding is satisfactory.

The first high speed equipment acquired by Mossberg for testing the Cold Point drill was a Carleton 3A drilling machine. Some typical applications performed on this machine include the machining of Mangaloy, Vasco let 1000 and Rene 41. A 21/32-in. hole was drilled 1-3/8-in. deep in Mangalov in 20 seconds at 1050 r.p.m., .001-in. feed and a coolant pressure of 125 p.s.i. The customer who consulted Mr. Mossberg on this project was using a new drill for each hole. With a Cold Point drill, it was a matter of getting between nine and 12 holes per grind.

The Buffalo Hollow Spindle Drilling Machine was designed for use with Cold Point drills and Hoffman Diamond Impregnated Core Bits at speeds up to 10,000 r.p.m. Haynes 701 Stellite (77% Cr., 23% A1 203) was drilled for the first time with a Cold Point drill on the Buffalo. With a spindle speed of 3,000 r.p.m. and hand feeding, a %-in. hole was drilled 5/16-in. deep in 10 seconds. With this machine, it is possible to handle other heretofore impossible drilling jobs at production speeds, notably Lucite and Ryerson PVC..

Many experiments and production runs with Cold Point drills, 3/16-in. to 1½-in., have been made on other drill presses as well as turret lathes and gun drill set-ups. The only auxiliary equipment needed is a good coolant pump, effective coolant filter, a transfer unit and appropriate chucking unit, all of which are standard items.





Manufacturing and product design engineers have a look at the product before it is released for production. Author Allan Young is second from right in this group.

Growing in importance for efficient processing is the

# PRE-RELEASE REVIEW

By Allan Young, Collins Radio Company

■ As a general rule, the product design engineer tends to design for function rather than production. This, of course, is his job. He is primarily interested in creating a product which will perform its proper function and do it well. The production engineer, be it tooling, methods, assembly, quality control, or what other titles may be used for production personnel, is mainly concerned with manufacturing the product efficiently, at the lowest possible cost, meeting delivery schedules, and at the same time producing it to the functioning specifications as established by the product designer.

This makes it desirable if not imperative, that the production or manufacturing people have a look at the product before it is released for production. This is best accomplished by a meeting between the representatives of the two divisions. In this way the problems of engineering development and production engineering can be discussed and resolved for the practical manufacture of the product to meet the requirements of both teams.

#### PRE-RELEASE REVIEW continued

At this meeting, or pre-release review, as it is sometimes called, all the drawings of new parts used in the product should be made available and examined, one by one, by both teams. A working model should also be presented if at all possible.

Anticipated Sales Quantity-This is of first importance. Without this advance information, or at least some idea as to the sales potential, it cannot be determined as to what type of tooling to expect or on which machines the parts are to be run. This would mean the difference between hard-way parts, cheap tools, or permanent tools. For round parts it might mean running them on lathes or consideration of automatic screw machines. Consideration of machining from solid bar stock or going to special stock or castings depends on quantity involved, in many cases. Type of dimensioning may be different for hard-way parts and parts for permanent tools.

Accuracy of Equipment—This can and often does determine how much time and money can be spent scrutinizing and analyzing a product at the pre-release review. A highly precision unit will naturally require closer collaboration between product design and manufacturing than an average run-of-the-mill product, which might be associated with or compared to equipment which has previously been manufactured.

Method of Dimensioning and Tolerances—Quite often the product designer can give a little on tolerances if he knows the problems of production and has an idea of the difference in cost a looser tolerance might make. Type of dimensioning depends largely on anticipated quantity. A different requirement might exist if the product design team were advised to dimension differently for hard-way parts as distinguished from permanent type tools. This, too, determines to a large degree which section of manufacturing will produce the parts. Methods of dimensioning and type of tolerances are especially important in castings, and in almost all parts containing drilled or pierced holes.

Design from a Tooling Standpoint— This should be of great concern for feasibility of manufacture also. Some examples of problems encountered in this aspect are:

 Holes too close to an edge. (Can material be added?)

Is distortion permissable in forming where it might occur?

 Are countersinks and counterbores properly dimensioned?

 Can breakout be allowed on a tight-toleranced hole which could be pierced?

 Is the part dimensioned to allow bending in a press brake, or is a form die needed?

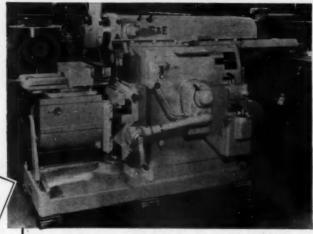
 Are castings properly dimensioned, and is a reference cast surface given from which to start the first machining operation?

 Could the part be redesigned to simplify tooling?

Advance Consideration for Difficult Parts—The pre-release review not only lets the production people know what to expect in the near future, it also gives them the opportunity to get advance action on parts which are difficult to procure or tool. This might even involve the purchase of new machinery or inspection equipment.

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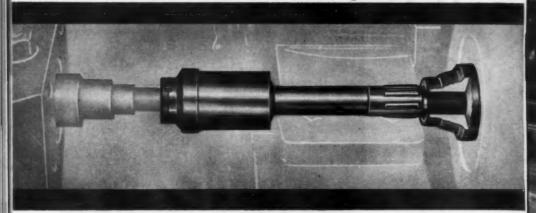
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# news of automation



Wiedematic turret punch press equipped with GE Mark III control.

## GE PLANT FORESEES BIG SAVINGS WITH TAPE CONTROLLED TURRET PUNCH PRESS

■ An integrated machine-control combination worthy of inclusion in the rapidly increasing family of numerically controlled machine tools was shown to the technical press at General Electric Company's Specialty Control Dept. plant in Waynesboro, Va., recently. A 100-ton turret punch press designed specifically for automation by Wiedemann Machine Co., using GE modified Mark III numerical positioning control, is being used for short run production work in the Waynesboro plant.

The Type A-100 Wiedematic can pierce sheet metal or plate up to 60" x 100" x %" in a single handling at a

#### NEWS OF AUTOMATION continued

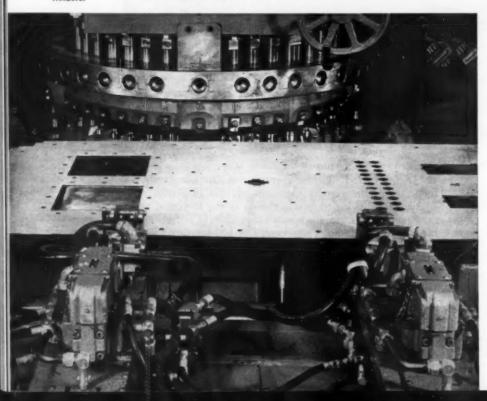
production rate of approximately 30

hits per minute.

Tape preparation can be accomplished with a standard tape punching machine, working to a simple work chart that lists the X and Y dimensions and turret station number for each opening. General Electric, however, makes extensive use of their own development, the Auto-programmer, for tape preparation. This unit produces a tape from a dimensionless drawing using an optical system. With this method, GE is realizing savings in drafting time up to 75 percent.

Substantial savings in tooling costs are realized with the Wiedematic since only one punch and die of a size are required, regardless of the number of openings. Large rectangular openings can be made by a series of "hits" with a single tool. All tools normally required are in the turrets ready for use. These piercing tools include rounds, groups, or any other shape or size within the capacity of the press. Automatic turret rotation brings the tool into piercing position at the front of the press, while mechanical locking of the turrets as-

Thirty-six different punches and dies up to eight inches in diameter are carried in the turrets of the Type A-100 Wiedematic turret punch press. As directed by the tape actuated numerical positioning controls, turrets rotate to bring proper tool into piercing position in two seconds or less. Typical pierced panel is shown being held by special work holders.



# WHY G.E. BOUGHT A NUMERICALLY CONTROLLED WIEDEMATIC TURRET PUNCH PRESS

Remarks By Dr. L. T. Rader General Manager General Electric Company Specialty Control Department Waynesboro, Virginia

At the General Electric Company we make a very thorough study of economics before we buy plant equipment of this size. And such an expenditure requires a good look on the part of my bosses.

The figures on the plant appropriation request that was approved to buy the press are as follows:

We estimate a \$48,000 cost reduction the first year, made up as follows:

Indirect labor-\$6,000

Direct labor-\$19,000 a reduction of 4 men)

Manufacturing losses-\$5,000 (this a 35% reduction from our previous experience)

Special tools—\$4,000 (with this automated machine we use standard tools and eliminate our previous need for multiple hole punches)

Subcontracting—\$20,000 (the speed of operation of this machine will enable us to eliminate subcontracting at peak load times)

Drafting-\$3,000 (with this automated machine we are able to use a simplifed 3-step system from a tabular drawing to automatic operation)

Overhead \$1,000 Less depreciation \$10,000

This accounts for the net reduc-

tion of \$48,000 estimated for the first year of operation.

In addition, we expect a \$20,000 reduction in inventory as this automated press is 400% faster in operation than the manual equipment we had prior to the purchase of this new machine. With our new machine flexibility, we also expect to save 2,140 sq. ft of floor space, a 42% reduction, now required for sheet metal storage. The new automated press replaced two R-41 and R-61 turret punch presses and eliminated the need for additional manual equipment which we would have had to buy otherwise.

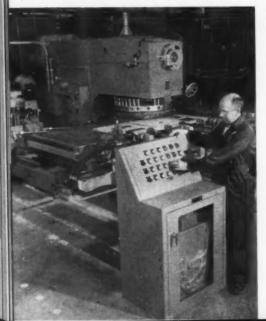
This appropriation emphasizes that the savings on automated machine tools go far beyond direct labor. Important savings are to be found in areas of better quality, simplified procedures, reduced floor space, reduced inventory and elimination of special tools. And the benefits story does not stop here. Let's look at engineering.

This plant appropriation shows that we can expect, through the use of numerical control, to benefit from simplified drawings and engineering work procedures. In my mind, possibly the most significant advantage of numerical control is in freeing engineers to do real engineering work. Secondly, this machine enables our engineering people to have a proving ground for their work on a numerically controlled system, (a machine and control).

sures tool alignment. When desired, any punch and die combination can be replaced in 1½ to 3 minutes.

The specifications for this machine require that it shall produce at a rate of 20 to 40 hits per minute to an absolute hole accuracy of plus or minus 0.010 inch. Wiedemann's Chief Engineer Walt Rainey pointed out that these figures are meaningless unless qualified in terms of an average table and turret positioning increment and an average number of turret changes per minute. For approximately 30 hits per minute on this machine, these figures are 4 inches average table motion in both axes, 30 degrees average turret motion and approximately three turret changes per minute. These figures provided the basis for selection of

Operator stands at the console as the Wiedematic completes an automatic sequence of operations. Tape reader is shown within console cabinet. Hydraulic power unit for press is shown at the extreme left.



optimum table and turret speeds and rates of acceleration and deceleration. Table velocities in excess of 900 inches per minute and accelerations of approximately .5 gravity have been measured. Reliable operation at specified accuracy and hits per minute on production parts is obtained at table speed of 600 inches per minute. Turrets operate at a rotational speed of approximately 15 R.P.M.

The punch and die turrets are 55 inches in diameter with a combined weight of 6500 pounds completely tooled. This heavy mass must be accelerated to a rotational speed of 15 R.P.M., decelerated and stopped with an accuracy of plus or minus 1/16 inch of the center line of the turret locking, or index pins.

Table motions are maintained under continuous servo loop control at all times except for a brief interval after the punch has been stripped from the work. The loop is opened at this time to permit the transfer of data from buffer storage to the servo amplifier section.

Automatic work holders, sensitive to signals generated by proximity pick-ups were developed to permit punching close to the edge of the sheet. When the pick-up head registers with a profile cam located in front of the turrets the work holder jaws open and the clamp is retracted. Conversely, when the head moves away from the cam the work holder returns and re-clamps the sheet. These units are important auxiliary devices which eliminate the necessity of interrupting the machine cycle for manual relocation of the clamps to permit edge of sheet punching.



Stop gages, side and rear, can be set directly to coordinates from a drawing without developing layout for holes to be punched.

## LOW COST ANSWER TO SHORT RUN PUNCHING

■ Ready Metal Company of Chicago is a medium sized sheet metal job shop and fabricator of some stock items in the metal furniture and equipment line. The bulk of their production, however, consists of small runs and sometimes single runs on custom parts or products ranging from small boxes and radio type chassis panels up to large storage cases built to order.

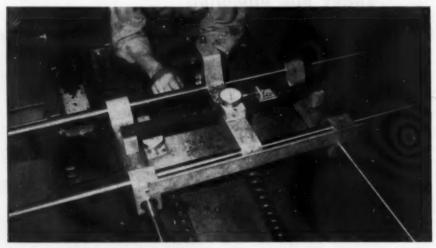
In handling all varieties of sheet metal cutting and fabrication, millions of holes of different sizes have to be punched, drilled, nibbled or cut by whatever method is feasible for the type of job being done. So many small run jobs require such a variety of holes that large presses and dies are entirely too costly to set up or operate. Yet, simpler methods of producing the holes are too slow. The ideal compromise was reached and entirely new methods brought speed and economy to such jobs when the company installed two Wales Strippit Fabricators. One is equipped with standard back gage and finger stop

support bars graduated for accurate adjustment to punch center from edges of sheet. The other is equipped with a special attachment called a Duplicator which provides for two different approaches to hole layout and location.

The Duplicator speeds up production of duplicate pieces by means of a pantograph-like coordinate tracer and a metal template. All holes of a template are punched on centers and are the same size as the tracing stylus. The stylus is moved by hand over the surface of the template to locate a hole. When it is in exact position, the point of the stylus can drop into the template hole and actuate a switch concealed in the stylus handle. This switch controls the punch driver on the machine. The work piece, held by clamps, is moved around the machine table by the duplicator.

While all the template locating holes are the same size because of the stylus which must drop into them snugly, the different sizes of holes required in the work piece are indicated by color coding the template holes. An operator merely installs the desired punch and die in the machine and traces out all the template holes of that color. When he has finished with one size of hole, he changes tools to another and traces out all of that color. This procedure continues until the work piece is completed.

All sizes of holes are punched in a single work piece before changing to the next. This is faster with the quick change tools than would be relocating successive work pieces for a complete run on each different kind of hole. Punch and die sets are changed by lifting out both punch and die from their holders and simply dropping in the new tools. No locking



Duplicator attachment can be used two ways, here to locate coordinates for hole location by precision readings on indicator dials.

is required since both punch and die nest in place by gravity. Automatic self-alignment in the rigid members of the machine eliminate another possible problem.

A second method of operating the duplicator eliminates the need for a pre-punched template. This method utilizes the tubular ways which represent the "X" and "Y" coordinates. Each is equipped with a dial indicator and a "Microbar assembly" which is punched at intervals to accept stop gage blocks. Stop blocks and dials can be related to the two coordinate dimensions from a drawing and each of the cross motions of the duplicator can be brought to close tolerance positioning directly from a drawing of the part. The duplicator stylus (with its switch control) can be moved forward or backward, and to either side until both dials read correctly for a given position. The switch actuates the punch mechanism and a hole is made in the work piece precisely to simultaneous measurement of both coordinates. This set up is more applicable to production runs of a single setting.

Limits of movement in the duplicator permit handling of work up to a maximum of 15" x 25" and, according to experience at Ready Metal, up to 1/8" thick.

Speed of operation depends on the individual operator, his skill in reading prints or patterns, his agility in making settings. By watching the machine in operation, it seems apparent that all elements could easily be broken down for time study and each could be clocked with far greater ease than is found in many common machine operations.

Materials commonly punched at



Duplicator attachment stylus locates holes in metal template for multiple run of parts. Workpiece is moved under punch head by duplicator arms as stylus is moved from hole to hole.

Ready Metal for their wide variety of customers include aluminum, stainless steel, mild steel sheet, copper and brass; all in the mild state. One problem found in punching aluminum is the tendency for the metal to smear on the punch and bind the stripping spring. This was overcome by lubricating with a common cutting oil and water.

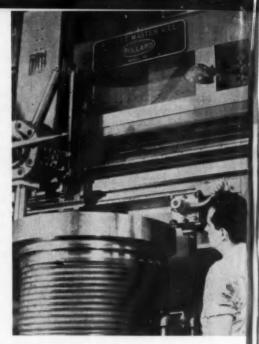


Sample work pieces made with Strippit.

#### **MACHINING 2-TON DRUM**

■ At Philadelphia Gear Corporation, a new 46-in. Bullard V.T.L. machines such parts as the drum for a gatehoist to be used in a major hydroelectric dam project. The drum is furnished as part of a complete assembly that includes motor, speedreducers, and cable-drum, on a common bed-plate. The drum contains two helical gears which form its endpieces. These gears are fabricated from carbon steel with a Brinell hardness of 200. The complete drum is 30 inches high, weighs 4,000 pounds.

The Bullard V.T.L. is used to machine the gear sections prior to cutting the teeth. O.D. and I.D. cuts are made at the same time with a single set-up.





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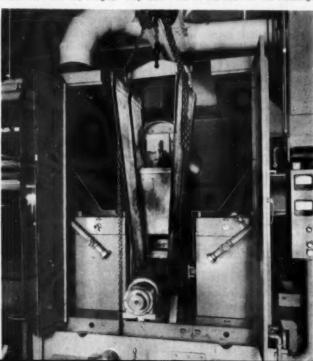
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## CANVAS SLING SIMPLIFIES HANDLING OF HEAVY ROLLS

■ A simple method of handling heavy machine rolls, developed by abrasives engineers of Behr-Manning Co. in Troy, N.Y., not only reduces man-hours by at least 80 percent, but also cuts injury hazard to the vanishing point. Developed for removing worn contact or billy rolls up to 60 in. in length from large grinders which use coated abrasive belts, the method is widely applicable in many plants.

Such rolls often weigh from 700 to 1000 lbs.; this weight, plus their awkward length and the necessity of working in close quarters, has made the changeover a difficult job.

Securely cradled, the roll is shown being withdrawn from the grinding machine. Note the hinged "trap door" cut in the roof of the housing.



New! \$15 \*

**Buys This Compact Mist Coolant Unit** 



Especially designed for small precision machinery used for drilling, tapping, sawing, grinding, etc. Up to 500% savings through increased cutting speeds and tool life. Check these quality features and write for complete details.

- —compact . . . measures 3" x 5"\_
- —separate air and coolant controls
- · —convenient mounting stud
- —attaches to existing shop airline
- —shatter-proof 8 oz. reservoir
- —neoprene flexible coolant line
- —magnetic nozzle holder positions anywhere
- —controlled discharge

Larger Types And Capacities Available

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TRICO FUSE MFG. CO.

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#### SHOP HINTS continued

The improved method starts with cutting and hinging a section in the top of the machine housing, in order to allow access for the sling. Next, mount a monorail and a one-ton hoist above and along the center line of the machine, extending the monorail six feet out from the machine housing.

Make a steel yoke or spreader bar an inch or two wider than the idler roll diameter, and build a sling of heavy-duty canvas. Hook each end to the steel yoke to form a cradle for the heavy roll. This sling should be reinforced with webbing sewn over steel bars at each end.

With the sling in place under the roll, disconnect the roll, hoist slightly to clear the ends, then pull it forward out of the machine and lower it to a dolly—preferably low to prevent tipping. Such a sling cradles the roll safely, preventing damage to rubber or other surfaces, and allows easy removal of journal bearings as well as thorough lubrication of bearing faces at both ends. Total cost including dollies was less than \$700.

Angle iron, reinforcing plates, industrial casters and a pair of cupped bearing rests make a safe and durable dolly for heavy rolls.







#### AID FOR SURFACE PLATE LAYOUT WORK

By H. J. Gerber

■ A short steel rule, secured to one of the vertical edges of a layout or inspection angle plate will greatly aid surface plate layout work.

We use this arrangement when making fractional measurement layouts with a surface gage. The scriber of the surface gage is set directly to the scale and then transferred to the work which is clamped to the face surface of the angle plate.

Several methods may be used to secure a rule to these cast iron angle plates. It may be fastened with machine screws, sweated on with soft solder, or simplest of all, cemented with one of the metallic or epoxy cements. Be sure that the end of the rule rests truly on the surface plate before fastening it to the angle plate so that all measurements taken from it will be accurate from this base surface.



#### SPELLMACO "SPOTTERS"

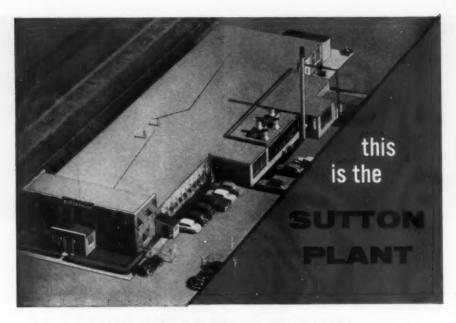
A matched set of transfer punches for toolmakers, machinists & tool cribs

Used for transferring location of threaded, drilled and reamed holes, slugs, blanks, etc.

Precision made of finest tool stack—Carefully heat treated and tempered for long life—6825 undersize to facilitate use—Black exide finish

Set No. 3-17. 28 punches with indexed stand—sizes 3/32" to ½", by 1/84"—plus handy 17/32" size. Length 4%" ONLY \$17.08 Single sizes available

R. L. SPELLMAN CO. - URBANA, OHIO



## Where SPECIAL TOOLS and ALL KINDS OF WORK-HOLDING DEVICES ARE MANUFACTURED!



- Standard and Special Chuck Jaws
- Expanding Mandrels
- Gear Hobbing Arbors
- Special Arbors of All Types
- Special Collets
- Special Collet Chucks (Air and Hydraulically Operated)
- Special Diaphragm Chucks to Customer Designs
- Milling Machine Adapters \* Special Adapters for All Machines \* Special Boring Bars
- \* Extension Tap Spindles \* Special Machine Spindles \* Special Screw Machine

Spools and Bushings \* Special Tool Blocks and Tool Holders

\* Special Cutter Heads \* Special Mill and Drill Sleeves \* Many Other Unusual Designed Tools

Check Sutton Ability to Make, Deliver, and Price Such Items as These! Write for Tool Bulletin No. 70

SUTTON TOOL CO., Dept. MTB-11 Phone 1194, Sturgis, Mich.

## free literature



To receive copies of booklets described below, circle their identifying numbers on an Action Card, found opposite pages 80 and 208.



(See Number 1)



(See Number 2)



(See Number 3)

- 1. Controlled Barrel Finishing. A seven-point system for scientifically controlled barrel finishing is detailed in "CARBOtrol 7," a 36-page, multi-colored booklet. Provided are size and type of media, ratio of media to parts, load height, water, compounds, barrel speed, and tumbling time. A complete line of tumbling media, barrel finishing compounds and precision barrel finishing machines and equipment is listed for the full range of tumbling operations. The Carborundum Co., Niagara Falls, N.Y.
- 2. Multiple Thread Milling Cutters & Gear Hobs are described and illustrated in 36-page engineering manual. Much informative material is contained on all phases of threading by the multiple thread milling process and the hobbing of fine pitch gears, including advantages, uses, application, sharpening, recommended feeds and speeds, thread generating and engineering data. Line drawings explain the more technical aspects. The Hanson-Whitney Co., Hartford, Conn.
- 3. Multiple Spindle Bar Automatics are covered in 44-page Catalog MSB-59, which lists and points out advanced engineering design and construction features of all models of four, six and eight spindle Acme-Gridley Bar Automatics. Many typical standard and special independently operated attachments are illustrated. Also included are general specifications and standard equipment for all models. The National Acme Co., Cleveland, Ohio.
- 4. Marking and Numbering Machines. Descriptions and drawings in literature available refer to supplemental items such as steel and metal marking tools and numbering machines, name-plate stamping machines, hand, pneumatic and motor driven metal marking machines, hot stamping presses and machines for plastics, printing machines for product marking, etc. Price list included. Acromark, Elizabeth, N. J.
- 5. Precision Thread and Cylindrical Gages, both standard and special, are covered in Catalog No. 58. Specification tables include sizes, tolerances, go and no-go classes, with prices. Master discs and plain rings also have specifications given. Precision ground gage blanks in .0005 increments from .030 to .750 are offered, with prices. Manufacturers' representatives and dealers' inquiries are invited. Active Grinding & Mfg. Co., Chicago, Ill.

#### FREE LITERATURE continued

6. Jigs. Four-page folder provides illustrations on new design features and construction of the Tumble Box jigs. Aluminum, cast iron, and steel have been combined to lighten weight. 47 sizes available, 1"x1"x1", to 4"x8"x4", with tracing templates for all sizes. Standard Parts Co., Bedford, Ohio.

7. Turret Slide. Brochure tells how the Newtools turret slide is suitable on any turret lathe with a center height between 6½" and 10"; with automatic feed supplied, center height is 7". Indexing accuracy of the hexagon-turret is .0001". Infinitely variable power feed attachment offered affords precision turning operations, drilling and roughing. Newtools Inc., Amityville, L. I., N. Y.

8. Abrasive Belt Grinders, which grind, deburr or polish, are described in literature as featuring adjustable work rests and back-up, positive belt tension adjustment. Model 760 has 1½"x6" belt, 7200 sfpm, 11¼" throat clearance; Model 562, 1"x42" or 1"x44" belt, 6000 sfpm, 5½" throat clearance. Burr-King Mfg. Co., El Monte, Calif.

9. "Cemented Carbides for Industry,"
Catalog C-16-B, comprises such changes
as 15% price reduction on standard
Carmet unground blanks and 5% price
reduction on standard Carmet brazed
tools and indexable inserts. Products

added to the line include Grade CA-8 added to precision ground negative and positive rake indexable inserts in popular sizes, etc. Allegheny Ludlum Steel Corp., Pittsburgh, Pa.

10. Center Laps. Catalog shows that Flexolap features an expansion barrel with off-center longitudinal alots which "give" under pressure to allow up to 15% expansion. Faster lapping, with extra flexibility, is offered. Set No. 1 contains six complete laps, one of each size (A", ¼", A", ¾", ¾", , nd ½"). Other sizes available. Federal Tool Corp., Chicago.

11. Two-Bearing Heavy Duty Buffers are illustrated, with specifications, in recent flyer. Four models include one to five hp, 1750 or 3450 rpm. Queen City Machine Tool Co., Cincinnati, Ohio.

12. Automatic Tracer. Gorton Auto-Trace Electro-Hydraulic 360° automatic tracer is ideal for production profiling inside or outside complex shapes, performing three-dimensional work. Featured are electronic tracer control with hydraulic feeds. Brochure from George Gorton Machine Co., Racine, Wis.

13. Precision Ground Steels, in over 1000 sizes, are presented in 16-page catalog. These comprise oil and air hardening, low carbon, precision ground tool steels. Also shown are tables or charts on thickness, widths, and prices. Peninsular Steel Co., Detroit, Mich.



(See Number 7)



(See Number 8)



(See Number 9)



## BARNES BAND SAWS INCREASE PRODUCTION AND LOWER COSTS!

From high production cut-off to intricate contour sawing operations, Barnes Hard Edge Flexible Back Band Saws are made to last longer, cut faster and more accurately. The result is a lower cost-per-cut and an ultimate over-all reduction in metal cutting costs.

You can expect superior performance from all Barnes Band Saw Blades because they are manufactured to the highest standards of quality. Teeth are accurately milled and set, perfectly hardened; backs are flexible.

Barnes Band Saws are packaged for your convenience and safety in 100-foot coils and in 250 or 450-foot random lengths. Band saws perfectly welded to a desired length are also available, packaged individually or 10 to a carton.



Best for sawing thin sections and for general purpose cutting of varied shapes and sizes. Designed to absorb shock, minimum footh strippage.

ARC-LINE

Preferred for accurate contour saving and for straight cut-off offarge solids, thick plate. Lives, maximum wear tesistance. BARNES SKIP TOOTH

Ideal for fast cutting of nonterrous metals, plastics and accod Proxides rapid chip removal on heavy sections. BARNES HOOK TOOTH

Recommended for fast cutting of mild steels, especially medium and large cross-sections. Also widely used on plastics and woods.

Call your Barnes Distributor

W. O. BARNES CO., INC.



#### FREE LITERATURE continued

14. Chip Breaker Drill is described in pocket-size brochure as controlling chip formation, and reducing chip size. Diagrammed specs. are covered for ordering No. 110 Lo-Tork taper shank or No. 120 Lo-Tork straight shank. Chicago-Latrobe, Chicago, Ill.

15. Optical Measuring System. Illustrated date sheet describes features and applications of Cincinnati Gilbert's Tele-Vernier optical measuring system for horizontal boring, milling and drilling machines. The Cincinnati Gilbert Machine Tool Co., Cincinnati, Ohio.

16. Hydraulic Surface Grinder. No. 10-H Covel model features 16½" vertical capacity, direct-driven ½ hp 3450 rpm motor, table size, 9¾"x44½". Folder describes hydraulic high speed table as reducing grinding costs and heat distortion. Covel Mfg. Co., Benton Harbor, Mich.

17. Metal Finishing. 40-page catalog supplies information on machinery and machinery systems for metal surface processing (cleaning, washing, rinsing, drying, spraying, flow and dip coating). Illustrated and described are Ransohoff-designed drum-type machines, conveyor machines and systems, combination drum and conveyor machines, and complete automatic finishing machines. Ransohoff Co., Hamilton, Ohio.

18. Small Press Brakes. Bulletin No. S-59 presents many features and complete spees. for Model 131, 11-ton capacity, and Model 265, 25-ton capacity, Chicago light-duty press brakes. Dreis & Krump Mfg. Co., Chicago, Ill.

19. Drilling and Reaming Machine. A Fox E-60-H four-station multiple spindle drilling and reaming machine is illustrated and described in flyer offered by Fox Engineering Co., Fox Machine Co., Jackson, Mich.

20. Circular Milling Cutters Performance. A three-color nomograph offered is a punched, fold-out designed for ringbinder insert which shows cutting standards for circular milling cutters when applied to various metals and plastics. Morse Twist Drill and Machine Co., New Bedford, Mass.

21. Bell Type Furnaces. Eight-page bulletin No. SEC-2 describes Sunbeam's complete line of gas-fired and electric bell type furnaces. Sunbeam Equipment Corp., Meadville, Pa.

22. Rolled Alleys. Metal RA 309, used where heat or corrosion is a problem, is presented in Bulletin No. 109. Descriptive charts show composition, density, mean coefficient of expansion, melting point range, mechanical properties, creep strength, and stress rupture properties. Rolled Alloys, Inc., Detroit, Mich.



(See Number 16)



(See Number 17)



(See Number 18)



## precision sleeves, sockets, holders, cut "unavoidable" accuracy loss

Why sacrifice accuracy when tooling up machine tools?

Scully-Jones precision sleeves, extension sockets, and turret tool holders are made of Stressproof steel. Hardened at wear points to maintain accuracy, resist wear, and give long, trouble-free service.

Inside and outside tapers of sleeves and turret tool holders are concentric within .002". O.D. hardening gives maximum strength—guards against nicking, a major cause of runout.

Extension sockets have hardened hole and tang-ends. Shanks and taper holes are concentric within .002".

Keyhole-type drift slots (above) accommodate "Scully-Drift" tool ejectors, permit fast tool changes, help avoid spindle damage.

Your Scully-Jones representative or distributor can tell you all about these and other precision holding tools.

Scully-Jones and Company
1907 South Rockwell Street, Chicago 8, Illinois



#### "Scully-Drift"

Twist-of-the-wrist cam action ejects tool—stops hammering and resultant damage to spindles, bearings, and tools.



SLEEVES AND SOCKETS

#### FREE LITERATURE continued

23. O.B.I. Mechanical Gap Presses. Bulletin M-1000 graphically uses three colors to illustrate construction and operating advantages of the Oliver-Farquhar O.B.I.'s, including data on the two series available in 75, 110, 150 and 200-ton capacities. 1000-Series is equipped with airoperated friction clutch mounted on back shaft, while 2000-Series has clutch mounted on crankshaft. The Oliver Corp., A. B. Farquhar Div., York, Pa.

24. Roll Lathes. New line of Farrel-Betts roll lathes can be arranged for either hydraulic or electric contouring, and furnished for plain turning with a wide range of feeds. Five different bed widths are available, providing a range of 15 sizes to handle rolls to 78" dia. Bulletin 1217 from Farrel-Birmingham Co., Inc., Consolidated Machine Tool Div., Rochester, N.Y.

25. Collets and Feeders. 24-page catalog illustrates and describes Sutton collets and feeders for use on automatic screw machines, turret lathes, engine lathes, milling machines and grinders. Featured are standard collets, "quick change" master collets, "full floating" master collets, master feeders and super feeders. Price lists and ordering instructions provided. Sutton Tool Co., Sturgis, Mich.

26. Clamping Tools, Jig Components. The front cover of Catalog No. 29 shows various applications of step blocks and clamps and jig and fixture components in actual use, along with a description explaining why they are used. Pages following illustrate, describe, and give spees. for toggle shoe clamps, hand knobs, jib feet, screws, fixture keys, nuts, etc. Northwestern Tools, Inc., Dayton, Ohio.

27. Finishing Machine. Literature on the Roto-Finish Vibratron precision finishing machine includes a diagram illustrating the action of the machine, with its operation and design features. Eight illustrated case histories show before and after parts photographs. Also contained are machine specs., sizes, and optional equipment available. Roto-Finish Company, Kalamazoo, Mich.

28. Electronic Gaging Systems. Radio Corp. of America offers a brochure on its electronic gaging systems. A complete description of such systems and of each of the modules comprising them is given. Typical applications are shown. In addition, RCA also is offering a complete line of electronic gaging modules for those interested in "do-it-yourself" instrumentation. Radio Corp. of America, Detroit.

29. Automatic Liquid Spray Buffing is the subject of 16-page Bulletin LIQ-600 on set-up and operating procedures for automatic buffing, burring and polishing.



(See Number 23)



(See Number 24)



(See Number 25)

## |VARIMATIC|

#### The SUPER SENSITIVE, SMALL-HOLE, PRECISION DRILLING MACHINE

With capacity of .004" to 5/4" in all drillable materials, and spindle speeds from 840 to 9300 R.P.M. Infinitely variable in two speed ranges . . . this is the machine which the precision industries rely upon to handle the "heart-break jobs."

"for the finest work you a



#### ALSO . . .

Three companion drills, each built to the same accuracy but differing in drive, speed range, and clearances, to cover the full range of special precision requirements.

#### AND A TAPPER . . .



with capacity from .034" x 120 to 1/4" x 24 . . . and a "reserve of accuracy."



#### 2488

You will want full information about the Hamilton Line of precision drilling and tapping machines. And we will be glad to furnish it.

Ask for our FREE BULLETIN NO. 2488



#### ADDRESS

Hamilton Tool
USE IT WITH CONFIDENCE

THE HAMILTON TOOL COMPANY 826 South Ninth Street HAMILTON, OHIO

#### FREE LITERATURE continued

Information includes material on recommended abrasive grades, drawings of typical layouts and a section on recommended equipment. The Lea Manufacturing Co., Waterbury, Conn.

38. Stock Straighteners. Literature available contains all specs., details, sizes and prices on Durant Tool's advanced line of stock and wire straighteners. Listed is a most complete line of stock and wire straighteners, both manually operated and motor driven. Durant Tool Co., Providence, R. I.

31. Cylindrical Grinding Wheels. Folder sets forth an explanation of the desired characteristics of cylindrical wheels. It describes the abrasives and bonds employed for various cylindrical eutting operations. Photographs of the various types of cylindrical wheels are also included. Macklin Co., Jackson, Mich.

32. Straight Side Presses. Details of the recently modernized KRW straight side, single action, hydraulic press line, which has been expanded to include a range of 25 through 1000 tons, are provided in illustrated Bulletin 5-B. Among the features listed are easily adjustable hydraulic systems, and constant speed and variable speed stroke arrangement. Specs. are included for all 48 models, with either up-acting or down-acting platens. K. R. Wilson, Inc., Arcade, N. Y.

33. Titanium Metals. A comprehensive handbook recently published outlines corrosion resistant properties of titanium metal and its design and fabrication characteristics. It covers titanium's behavior in some 200 corrosion environments. Guides are established for use of conventional equipment for tube and sheet metal bending, drawing, surface treatment, machining, annealing, pickling, welding, and assembly. Case history data, titanium metal weight tables, and size ranges of titanium mill products are included. Titanium Metals Corp. of America, New York City.

34. "Replacement Analysis Manual" provides industry with a tool which can be used to better appraise machinery replacement from a sound investment standpoint. The manual includes the Replacement Analysis form, a discussion of the pros and cons of replacement policies in general, an explanation of the terms used in the form, and actual case histories of replacements made by customers. The Heald Machine Co., Worcester, Mass.

35. New Prices en Ball Seat & Shoulder Punches. Pivot Punch and Die Corp. has introduced a new pricing policy for their commercial line of ball seat and shoulder punches. Catalogs include information on straight ground punches with Pivot's patented whipsleeve; square, oblong and rectangular punches, die buttons and retainers, complete with price lists, as well as the new discount sheet. Pivot Punch and Die Corp., N. Tonawanda, N. Y.



(See Number 30)



(See Number 31)



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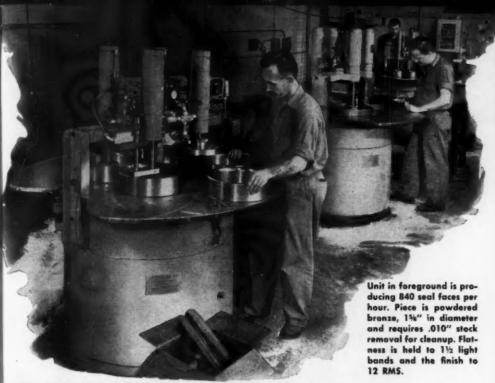
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(See Number 32)



# SPEEDLAP with ..... ONE OPERATOR PRODUCING 840 SEAL FACES PER HOUR

If your production calls for rapid stock removal with high accuracy in size, flatness, parallelism and finish, be sure to check on Speedlap's performance.

These units grind and lap at the same time with micro-inch accuracy. Give you finishes of 1 RMS; flatness and parallelism to 2 millionths of an inch—with tungsten carbides, ceramics, tough alloys or plastics. Best of all they give you LAPPING ACCURACY AT GRINDING PRICES.

Ask for cost and production estimates based on samples of your work. No obligation. Job lapping service also available.

## 5 Exclusive

enable a Speedlap to finish jobs better and faster:

- Water cooled lap base dissipates operational heat to avoid distortion.
- Non-chargeable alloy lap plate assures rapid stack removal.
- Full wear control maintains constant lap flatness.
- Adjustable parts handling stage loads and unloads parts quickly.
- Full pressure air system maintains maximum lapping pressure and automatically raises pressure pletes at end of lapping cycle.



#### STANDARD EQUIPMENT

Air clutch and brake. J.I.C. controls. Dual air valves. Adjustable gibs. Hard bronze crankshaft bearings. Forced lubrication.

**WRITE** for information. Also, other O.B.I. presses, straight side and gap frame presses.

- Completely new design in geared and non-geared types incorporates proven construction features.
- Exceptional rigidity insures long die life and close product tolerances.
- Large box-type slide mounted in long gibs holds accurate alignment.
- 125 ton capacity covers wide variety of jobs.
- Big die capacity—bolster area 42" x 29"—shut height 18", or to suit.
- Versatile efficient dependable.

#### L&J PRESS CORPORATION 1625 STERLING AVE.

## news of the industry



Flow brings 3000 piece lots into grinding area through opening in rear wall. Rings move to face grinder, then to lapping machine and to centerless O.D. grinder in foreground. Grinding area is air conditioned with acoustically treated dropped ceiling.

Norma-Hoffman Opens "Showplace of Precision" To Produce Ultra-Precision Bearings

A specially designed add-on plant for manufacturing ultra-precision angular contact bearings is now in operation at Norma-Hoffman Bearings Corp., Stamford, Conn.

Designed and built by the company's own engineering and operating personnel, the new facility is reported capable of producing more than a million dollars in high precision bearings annually. The air conditioned and humidity controlled facility contains "the most modern machinery, methods and instruments available to the bearings industry," according to Richard D. Robertson, vice president in charge of manufacturing.

Norma-Hoffman expects the market for ultra-precision bearings (ABEC-7 tolerances or better) to witness a major growth in the next few years, primarily in precision machine tools, aircraft auxiliaries, woodworking machinery, computers and memory devices, high speed gear trains and similar applications involving speeds in excess of 50,000 rpm where extreme precision and maximum rigidity are mandatory.

Special ball track honing machines developed by Norma-Hoffman engineers provide a finer surface finish.



#### 22 Machine Tool Companies Receive Advertising Awards

Twenty-two machine tool companies will receive awards in this year's Advertising Competition sponsored by the Advertising and Marketing Research Committee of the National Machine Tool Builders' Association. The awards certificates will be presented to the winning companies at the Association's Fall Meeting at The Greenbrier, White Sulphur Springs, West Virginia, on November 20, 1959. A total of 224 entries in the competition were received from 52 companies.

Judges were Dr. Joseph E. Bachelder, director, Industrial Advertising Research Institute, Princeton, N.J.; Clyde W. Clark, Jr., treasurer and general manager, Dearborn Tool & Die Co., Dearborn, Mich.; and Harry Rourke, purchasing agent, Factory and General Supply, Ford Motor Co., Dearborn, Mich. The seven categories in the contest and the winning companies are as follows:

Category 1, trade paper advertisement, black and white—First: Nebel Machine Tool Corp., Cincinnati, O. Honorable Mention: The Warner & Swasey Co., Cleveland, O.; Mattison Machine Works, Rockford, Ill.; Landis Machine Co., Waynesboro, Penn.; The Cincinnati Shaper Co., Cincinnati, Ohio.

Category 2, trade paper advertisement, two colors—First: The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio; Honorable Mention: The National Acme Co., Cleveland, Ohio; Excell-O Corp., Detroit, Mich.; Clearing Machine Corp., Chicago, Ill.; Landis Tool Co., Waynesboro, Penn.

Category 3, trade paper advertisement, three or more colors—First: The New Britain Machine Co., Lucas Div., Cleveland, Ohio; Honorable Mention: The New Britain Machine Co., Gridley Div., New Britain, Conn.; Greenlee Brothers and Co., Rockford, Ill.; Buhr

Machine Tool Co., Ann Arbor, Mich.

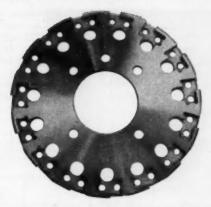
Category 4, catalog or bulletin describing a single type of machine—First: Clearing Machine Corp., Chicago, Illinois; Honorable Mention: Baker Brothers, Inc., Toledo, Ohio; The Cincinnati Milling Machine Co., Cincinnati, Ohio; Nebel Machine Tool Corp., Cincinnati, Ohio.

Category 5, catalog or bulletin describing a line of machines—First: The New Britain Machine Co., Lucas Div., Cleveland, Ohio; Honorable Mention: Illinois Tool Works, Chicago, Ill.; Armstrong-Blum Manufacturing Co., Chicago, Ill.; Ex-Cell-O Corp., Detroit, Mich.

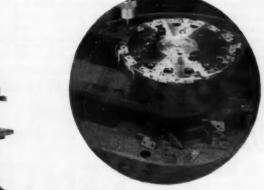
Category 6, best single direct mail piece—First: The Heald Machine Co., Worcester, Mass.; Honorable Mention: Greenlee Brothers & Co., Rockford, Ill.; Snyder Corp., Detroit, Mich.

Category 7, complete program to introduce a new machine tool—First: Baker Brothers, Inc., Toledo, Ohio; Honorable Mention: Norton Co., Worcester, Mass.; Verson Allsteel Press Co., Chicago, Ill.; Ex-Cell-O Corp., Detroit, Michigan.

Summing up this year's competition, George A. Hawkins, Chairman of the Association's Advertising and Market Research Committee, had this to say: "I think the net effect of this annual competition, now in its sixth year, has been to raise the level of advertising effectiveness throughout the machine tool industry. Certainly there had developed an awareness that today advertising is a basic and vital part of the operation of a company making machine tools. This has been accelerated as catalogs, technical literature and the like have become part of the advertising function, and advertising has, as a consequence, become directly interwoven with service, merchandising and sales promotion activities."



## this plate paid for itself in 11 hours...



#### ... and is still tapping 4400 holes per hour one year later!

The only tooling needed was the 15-position dial plate to hold the parts. The plate was bolted simply to a standard Snow Dial Index fixture on a standard Snow universal tapping machine.

We made the plate for our customer for \$165.00. It arrived in his plant 6 days after he delivered a box of blank parts to us. With the plate went a tag showing Snow machine settings, and estimated hourly production based on the test run already made in our own shop. Time required for customer to set up the new dial plate was ten minutes! Standard universal Snow machines for drilling, tapping, or threading are available in vertical, horizontal or angular models. Their modest price will amase you. They reduce changeover time, and cut tooling costs to a ridiculous minimum. 28 different types of standard airoperated fixtures are available from stock. On your next job, let us show you what the Snow method can do. Submit samples and prints.

Snow Manufacturing Company, 435 Eastern Avenue, Dept. B, Bellwood, Illinois (suburb of Chicago).

SNOW master fixtures save dollars and days in tooling costs.

#### **Industry Estimate of Metal Forming Machine Tools**

New Orders Concellations Shipments and Backley

DATE	NET NEW ORDERS			Estimated	SHIPMENTS		
	Domestic	Foreign	Total	Backlog (in months)	Domestic	Foreign	Total
Jan. Peb. Har. Apr. Hay June	\$ 24,850,000 31,050,000 36,050,000 37,200,000 34,800,000 49,800,000 p45,850,000	\$ 4,250,000 6,900,000 4,200,000 5,200,000 2,700,000 4,100,000 95,050,000	\$ 29,100,000 55,950,000 40,250,000 40,400,000 57,500,000 55,900,000 250,900,000	5.4 5.8 5.8 5.8 5.9 4.2 p4.7	\$ 20,000,000 22,000,000 32,400,000 37,500,000 33,400,000 28,550,000	\$ 5,400,000 5,100,000 5,450,000 2,650,000 5,750,000 p2,200,000	\$ 25,400,000 27,100,000 37,850,000 33,250,000 30,350,000 37,150,000 350,750,000
7 mos.	p\$257,600,000	p\$30,400,000	p\$288,000,000		p\$192,400,000	p\$27,450,000	p\$219,850,000

DATE	GROSS NEW ORDERS			CANCELLATIONS		
	Domestic	Foreign	Total	Domestic	Foreign	Total
1959 Jam. Peb. Nar. Apr. Hay Jume July 7 mos.	\$ 25,400,000 58,150,000 77,050,000 56,400,000 56,800,000 50,800,000 p47,150,000	\$ 4,300,000 6,950,000 8,400,000 8,800,000 8,800,000 4,150,000 p5,100,000 p6,000,000	\$ 29,700,000 77,100,000 11,550,000 11,650,000 53,650,000 54,550,000 252,250,000 p\$295,750,000	\$ 550,000 1,200,000 1,000,000 1,000,000 1,000,000 1,000,000	\$ 50,000 50,000 200,000 50,000 100,000 50,000 950,000 p\$550,000	\$ 600,000 1,150,000 1,200,000 1,250,000 1,150,000 2,950,000 p1,750,000

This table includes industry estimate figures based on reports submitted to the National Machine Tool Builders' Association, 2139 Wisconsin Ave., Washington, D.C. These industry estimates have not been adjusted for change in the value of the dollar.

For extreme accuracy under heaviest radial and thrust loads...



BULL

LATHES: 30 MODELS GRINDERS: 22 MODELS

PIPE

Stocked in all standard taper sizes and straight shanks. Immediate delivery on head sizes up to 12" dia.



FEATURE: 3 & 7 ABEC-SPEC bearings. Heads made of chrome nickel steel, hardened for greater resistance to abrasion wear. HD model has an adjustable bearing assembly with positive locking control.

CALL YOUR DISTRIBUTOR OR WRITE

Center Specialists Since 1908

OTHER HEADS AND SHANK SIZES AVAILABLE



READY TOOL COMPANY

168 Garfield Ave. Stratford, Conn.

Use postpaid card. Circle No. 401

MACHINE and TOOL BLUE BOOK

#### Baird Machine Mobile Showed High-Production Machines

The Baird Machine Mobile took two of the Stratford, Conn. firm's newest entries in the high-production machine tool field on a cross-country jaunt aimed at orienting distributors and potential customers on the operation of the firm's products. A display mounted on a two-axle trailer, the exhibit included the No. 2-19 multiple transfer press and the No. 100 four-slide machine.

The Baird automatic four-slide machine has been designed for high production of articles made of any commercial wire-round, half round, square or flat. The Baird automatic multiple transfer press accomplishes a wide range of high-



Baird's Machine Mobile is shown with one of the views dealers saw on the five-state itinerary during September and October, Shown is the Baird No. 2-19 multiple transfer press,

volume multiple operation work which requires a transferring to several positions for subsequent piercing, forming or drawing, lettering, embossing or similar operations.



Look — at these sheared tubular ends — clean, true contoured and close fitting with a minimum of burr and distortion . . . You can make them fast, some up to

2000 an hour with Vogel patented tools. Or, if you prefer, we can do your notching, shaping, shearing and perforating . . . Either way

#### You save on cost!

Samples of shearing and notching (also estimates) gladly furnished without obligation. ARC-FIT® notches up to 720 per hour.

ARC-SNUG prepares pipe ends for snug brazing—up to 500 pieces per hour.

ARC-TWIN® double notches pipe up to 750 pieces per hour.
CUT-OFF shears tubing in two up to 2000 per hour.

#### **VOGEL TOOL & DIE CORPORATION**

1827 North 32nd Ave., Stone Park, III.



Only two settings required. No guesswork, no ruined drills. Handles Core drills, Two-lip drills, Four-lip drills, straight and tapered shanks. Patented feed system assures correct heel clearance, chisel or web angle, and cutting lip angle.

Complete, nothing else to buy . . only

\$17500

**LISLE Corporation** 

CLAPINDA

156

IOW

Use postpaid card. Circle No. 308

#### American Machine & Foundry Has \$42,600,000 Titan Contract

The Air Force has awarded a definitized contract in the amount of \$42,-600,000 to the American Machine & Foundry Co. of New York City. The contract was let to build, install and test the first 18 operational underground launching systems for the top-priority Titan Intercontinental Ballistic Missile, at Lowry Air Force Base, near Denver, Colo.

Actual manufacture of the equipment will be done at AMF's Buffalo plant with continuous engineering and management support assigned to the company's engineering division and Government Products Group at Greenwich, Conn.

The new contract raises the total of AMF business for Titan launching systems within the past year to over \$85,000,000.

#### Carborundum Launches Accelerated Tumbling Program

A fully integrated program for the manufacture and sale of abrasive tumbling media, barrel finishing compounds, tumbling machines and equipment is announced by the Electro Minerals Division of The Carborundum Co., Niagara Falls, N.Y.

Nelson J. Watkins heads Carborundum's integrated tumbling program in the capacity of product manager of Barrel Finishing. Reporting directly to D. N. Rodger, manager of Industrial Sales, Watkins coordinates the program from engineering design through manufacturing and marketing.

In addition to training salesmen and engineers in the science of tumbling, a selected group of field sales engineers have been trained and stationed at the district sales offices. These engineers and their territories now covered are as follows:

R. C. Bensman, Buffalo and Pittsburgh districts out of Niagara Falls; John I. Jenkinson, New England states from West Springfield, Mass.; H. S.



- \* MILLS SMALL PARTS MUCH FASTER
- \* DRASTICALLY CUTS YOUR INVESTMENT IN EQUIPMENT. Replaces expensive production machinery—or releases it for other jobs.
- \* INEXPERIENCED HELP CAN OPERATE IT. Safe, simple fool-proof operation.
- \* NO MORE COSTLY SET-UP TIME. \$114.00\* price so low that it pays to keep one or more Hand Millers always set-up for special operations.
- \* YOU GET A BETTER PRODUCT—the result of ABSOLUTE ACCURACY.
- \* A LOSS BECOMES A PROFIT when marginal pieces are finished on the Hand Miller instead of on high cost equipment.
- \* VERY LOW MAINTENANCE.
- \* USED REGULARLY IN 1163 MANUFACTURING PLANTS (some of which use as many as 30 machines)—yet on the market a scant few years.
- \* UNIQUE—VERSATILE. Nothing else like it. One or several machines can be the answer to some of your production problems.

Write today for further information H. B. ROUSE & COMPANY

2214 N. WAYNE AVE., CHICAGO 14

50 YEARS OF SERVICE TO INDUSTRY

#### Another

## VICTOR VALUE



**Top Quality Lowest Prices** 

Our Special Import...

#### DIAMOND WHEEL DRESSERS

Made of selected, full individual stones, mounted in 7/16" diameter x 6" long cold rolled shank.

Karat	Regular Price	Our New Price
3/4	\$ 6.00	\$ 2.85
1/2	12.00	5.00
3/4	21.00	7.50
1	30.00	10.25
11/2	54.00	15.00
2	75.00	20.00
21/2	102.00	26.00
3	130.00	32.00

These diamonds can be set in any shank to your specifications for \$1.00 each extra.

Order today—Immediate
Delivery From Stock!

### VICTOR

Machinery Exchange, Inc.

Dealers in Tool Room Equipment

Dept. A, 251 Centre St. Tel: CAnal 6-5575, New York 13, N.Y. Holman, New York and Philadelphia (Bristol) districts; Joseph Laughlin, Jr., Southern district out of Atlanta; R. S. Wilson, the Southwestern district from the St. Louis office; E. J. Schultz, Detroit and Cleveland sales districts; W. F. Quirk, Chicago district; and E. J. Schweitzer, serving the Pacific coast area from Los Angeles district office. R. W. Fitch and R. A. Murphy, product sales engineers at Niagara Falls, will give engineering support to all field representatives.

Bellows Co. Purchases Jackson Electronic & Mfg. Co.

The Bellows Co. Division of The International Basic Economy Corp. has purchased the Jackson Electronic and Manufacturing Co. of Akron, Ohio. Jackson Electronic works in the field of research, development and production of industrial control systems, electronic assemblies and sub-assemblies for use in manufacturing industrial products and also makes electronic test equipment for use in the fields of aviation and missiles.

The Jackson Electronic company was formed in 1949 by A. V. Petrarca. He will remain with the company as will other key administrative and engineering personnel.

IBEC to Erect New Facility in South

Plans to erect a new manufacturing and assembly plant in West Memphis, Ark., have been announced by The Bellows Co., Valvair Corp. and Sinclair-Collins Valve Co., all of Akron, comprising the Fluid Power Divisions of International Basic Economy Corp. (IBEC). The new plant will facilitate distribution in the South.

The three companies, of which Herbert B. Link is president, manufacture and distribute pneumatic, hydraulic and electrical components for industrial applications in automating metalworking, textile, plastic and other manufacturing processes. Seven other plants are operated in the United States and Canada.

#### Michigan Tool Co. Enters Gear Grinding Field

Acquisition by Michigan Tool Co., Detroit, of the assets of Gear Grinding Machine Co. relating to gear grinding machines and processes has been announced. A new Gear Grinding Machines Division with headquarters at 7171 E. McNichols Rd., Detroit 12, has been established.

The new Michigan Tool Division will be responsible for engineering, manufacturing, service and sales of gear grinding equipment. Several top specialists in engineering, service and sales of gear grinding equipment at the former company are also joining the Michigan Tool organization.

#### Darwin & Milner, Inc. Quadruples Facilities

Darwin & Milner, Inc., has moved into new quarters in Cleveland with four times as much space. James White, president, says the new warehouse and office at 2222 Lakeside Ave., Cleveland 14, Ohio, with its 16,500 square feet of space, will enable the firm to greatly increase its stock and its range of sizes. Fast off-the-shelf deliveries can be made from the complete line of tool steels, die steels, and specialties.

The old warehouse and office were located at 2345 St. Clair Ave., in Cleveland.

### Illinois Tool Unites Two West Coast Divisions

Illinois Tool Works of Chicago has

"Donut"-type fluorescent fixtures direct light into work without heat, shadows, obstruction. Wide application... free literature.



STANDARD BORING MILL LITE CO. 6771 E. McNichols • DETROIT 12, MICH.

Use postpuid card. Circle No. 311

acquired a new 20,000 sq.ft. Hawthorne facility at 3155 El Segundo Blvd., El Segundo, Calif. Total value of land, building and improvements exceeds \$500,000. The new quarters will unite under one roof two West Coast divisions of Illinois Tool Works—the Calinoy Division of Hawthorne and the Pacsol Division of El Segundo.

#### Henry P. Boggis & Co. Name and Ownership Changes

Effective October 1, 1959, the machine tool business operated as Henry P. Boggis & Co. was sold to a new corporation being formed by Donald M. Pattison, who will be president and principal stockholder. The corporate name will be Henry P. Boggis Co., and operations will continue without interruption.

Henry P. Boggis will remain with the corporation as chief engineer and works manager.

## Dorman Automatic Reverse --- TAPPERS

· Automatic Torque

Cantral
One minute to adjust
Prevent tap breakage

Easy to Operate
 No skill required

 Wide Range of Tap Capacities
 No. 1A Friction Drive Tapper—capacity No. 2-56 to ½" in steel, ½" in aluminum. Also Positive Drive.

No. 2B Positive Tapper—capacity 3/8" to 3/8" in

No. 3A Positive Tapper—capacity 1/2" to 11/4" in steel.

No. 4A Tapper—capacity %" to 2" in steel including pipe taps.



Immediate Delivery Priced \$62.00

Also Production Threaders with Round Split, Button or Acorn Dies, Write for Bulletins and information,

Thriftmaster PRODUCTS CORPORATION

a Subsidiary of Thomson Industries, Inc.

1030 N. PLUM STREET 

LANCASTER, PENNA.

Also Adjustable and Fixed Center Drillheads

### **Appointments and Promotions**

#### Personnel Changes . . . Executive and Production



R. I. White



E. C. Hanna



J. R. Strom



J. W. Ferguson

Richard Irving White has been appointed by the Cutting Tool Div., Brown & Sharpe Mfg. Co., Providence, R. I., to replace William Yates, former Brown & Sharpe Cutting Tool Engineer in the New England and Upper New York State area . . . Leslie M. Hess has been elected vice-president and assistant general manager for the Landis Machine Co., Waynesboro, Pa. He is succeeded by H. L. Steck, former controller who was named controller-treasurer. E. C. Hanna was elected to the newly created post of director of engineering. George W. Lyman will take over Hanna's former position as chief research engineer . . . John R. Strom has been named as chemist and process engineer in charge of new product development and the development of new compounds for Roto-Finish Co., Kalamazoo, Mich. . . . William J. Pinkerton has been appointed by the Board of Directors of Micromatic Hone Corp., Detroit, Mich., to the position of executive vice-president and assistant general manager. He was also appointed to the Board of Directors to fill the vacancy created by the resignation of William H. Harris, Jr. . . . John W. Ferguson, formerly West Coast representative, is now general manager for the Boots Aircraft Nut Corp.'s West Coast office and warehouse at Pasadena, Calif. . . . Edward M. MacDougall has been announced as general manager of the Richard Brothers Punch Div. for Allied Products Corp., Detroit, Mich. He succeeds L. E. Coulter, who was elevated to president in 1958. . . .

## Personnel Changes Sales and Service

Peter B. Whitcomb, veteran spectroscopist, has been appointed by Engis Equipment Co., Chicago, as manager of their new department devoted to sales and service of scientific instruments...



L. M. Hess



G. W. Lyman



W. J. Pinkerton



P. B. Whitcomb



## FOR SPLIT-SECOND CLAMPING

The World's First Line of production toggle clamps is your first choice for any work-holding problem. If you require fast loading, clamping and unloading of production parts for grinding, drilling, chamfering, tapping, boring, routing, welding or assembly, check your De-Sta-Co Catalog first—or call your nearby distributor.

The clamps shown are representative of the 140 models and sizes in 13 basic styles; specials are available for your extraordinary problems. Sizes range from 1 ounce Tiny Toggles with 42 pounds holding pressure to 5 pound models developing 2 tons. All have features which are recognized as the standards which others imitate but never equal and you can get fast service and the good advice of top sales engineers from our stocking distributors in every industrial area.





W. Nyberg



R. H. Stebbins



E. F. Huge



W. T. Keating

Gisholt Machine Co., Madison, Wis., recently announced three changes in sales personnel: William Nyberg succeeded R. H. Presnall as district manager of Gisholt's direct sales office in Pittsburgh. Pa. Presnall has now been promoted to assistant sales manager in Madison, R. H. Stebbins, assistant sales manager since 1957, was named sales manager. . . . Lockwood Oliver, Jr., has been appointed sales manager of Bardon & Oliver, Inc., Cleveland, succeeding Edwin F. Huge, a 53-year veteran with the firm, who has retired from his position as vice president in charge of sales. Huge will continue as a director of the Board. . . . Brown & Sharpe Mfg. Co., Providence, R. I., announces that John F. Hines, formerly foreign sales manager in England, has been appointed sales manager of the Cutting Tool Div. . . . Armstrong Bros. Tool Co.. Chicago, has made various changes within its sales organization: William T. Keating has been named Boston area sales representative. As Eastern district sales manager, Robert E. White will make his headquarters at the company's New York City office. John F. Gaudian, formerly Chicago district sales manager, is now assistant sales manager and will continue to supervise Chicago district sales in addition to his new duties . . . William G. Moles is the latest addition to the Burg Tool Mfg. Co., Gardena. Calif. As direct factory representative he will cover the states of Md., Va., N.C. and S.C., Ga., eastern Tenn. and Fla. In addition, he will handle all government accounts in the District of Columbia . . . Long associated with the sheet metal trade and machinery sales, Vernon Haug has been appointed by Peck, Stow & Wilcox Co., Southington, Conn., as salesman in the Mid-west territory . . . Walter Stowe Rose has been named sales promotion manager for The Baird Machine Co., Stratford, Conn. He will be in charge of advertising and sales promotional programs, and the organization of distributor training programs ... Robert G. Holmes of 9350 Hamlin St., Evanston, Ill., has been appointed midwestern representative, with headquarters in Chicago, for the Acme Chain



R. H. Presnall



L. Oliver, Jr.



John F. Hines



R. E. White



W. G. Moles

Corp., Holyoke, Mass. . . . Henry Davis, Jr., has been named field sales manager of the Mechanical Goods Div., United States Rubber Co., New York City, replacing Matthew J. Delehaunty. Douglas M. Smith has been named as Davis' successor as Eastern regional manager, but will operate out of the company's Passaic branch rather than Baltimore. Delehaunty, a 48-year rubber industry veteran, has recently been appointed to the newly created post of market planning manager for the Mechanical Goods Division.



V. Haua

## HARDNESS CONVERSION CHART

For Every Shop That Does Hardness Testing This latest

This latest and most nearly accurate Hardness Conversion Chart is a necessity wherever hardness testing is done. It has been compiled and produced by CLARK, makers of the internationally respected CLARK Hardness Tester for "Rockwell Testing." Printed on heavy stock convenient for wall mounting, the chart is offered free of charge to hardness tester users. Just attach this ad to your letterhead or write "Send wall chart." A copy will be mailed to you without charge or obligation.

P.S. If you would also like information on CLARK Standard and Superficial Hardness Testers, we'll be glad to send that along





CLARK INSTRUMENT INC.

10206 Ford Road Dearborn, Mich. U.S.A.



Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

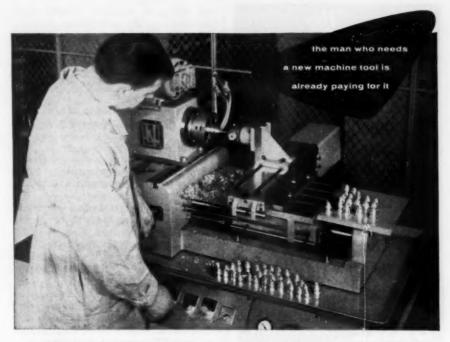
HOGGSON & PETTIS MFG. CO. 141H Brewery St. New Haven 7, Conn.

#### **BOOK REVIEWS**

The GRINDING WHEEL. Wm. F. Schleicher, vice president and editorial director of Hitchcock Publishing Co., Wheaton, Ill., authored the revision. Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15, Ohio. 532 pages. \$3.50

The current revision of The Grinding Wheel, based on the 1951 edition, contains over 100 pages of new material, with a total of 532 pages. Entirely new chapters have been written, including Mounted Wheels, Reinforced Wheels, Automation and Advanced Mechanization, and Safety. Jig grinding, electroassist grinding, optical projection grinding, filtering of grinding fluids and grinding of ceramics, are some of the new subjects which have been incorporated in standing chapters, Every chapter has been affected by the recent advancements in the science of grinding. These advancements have resulted in additions to such chapters as The Abrasive Materials, Disc Grinding, Roll Grinding, Costs, Evaluation of Surface Quality, etc.

In looking into the various chapters covered, the Grinding Fluids chapter gives the types of fluids and qualities desired in a grinding fluid. Evaluation of Surface Quality covers the equipment, approximate classification of machined surfaces, symbols, etc. A complete summary is provided of the equipment needed for operations in the truing, dressing and balancing chapter, The how-to-do-it type of information in the chapter on tool and cutter sharpening will benefit both operator and supervisor. Factors affecting wheel selection will be enlightening to the user of bonded abrasives. Up-to-date tables of maximum operating speeds



#### "Stingiest" Machine ever made

The J & L Precision Boring Machine is a mechanical tightwad: "Savings" for the owner are written all over it.

To begin with, its purchase price is far less than you would guess. Then, after it is set up, you find that just about anyone can handle its push button operation. Its simple design doesn't require expensive maintenance either.

This machine's "tightness" extends even to the spindle. It's not only extremely accurate, but also allows adaptation of various types of tooling. It has a threaded nose that will accept all standard air, or manually operated chucks and an inside taper to accommodate 5C collets.

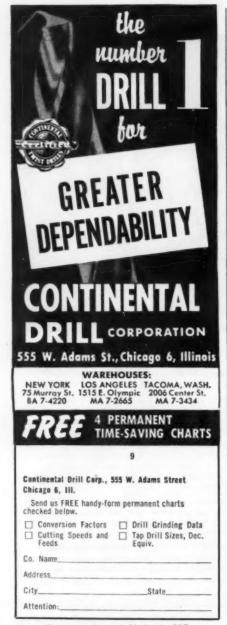
Think that's economical? Well this penny pincher will turn, face and bore at high production rates, yet, because tooling combinations can be shifted quickly, it takes care of the short runs too.

One other thing about the J & L Precision Boring Machine
... it has a tendency to push its owners into a higher income
bracket. If this prospect leaves you undaunted, write for
further information.



JONES & LAMSON Machine Company . Dept. 710, 520 Clinton St., Springfield, Vt.

Turret Lathes . Automatic Lathes . Tape Controlled Machines . Thread & Form Grinders . Optical Comparators . Thread Tools



and minimum machine spindle sizes are shown in the new Safety chapter.

This is a textbook not only for the student but for the practitioner, whether he be operator or executive.

HOW TO CHOOSE AND USE PORTABLE AIR TOOLS. Published by The Rotor Tool Co., 26300 Lakeland Blvd., Cleveland 32, Ohio. 90 pages.

The basic objective of the handbook is to help get more productivity from portable tools and thus cut costs.

The importance of cost is shown by stating that the portable tool operators earn approximately \$5,000.00 per year. On the average they are using portable tools probably 50% of the time. Each portable tool, therefore, involves a labor cost on the average of 50% of \$5,000.00 per year, or \$2,500.00 per year. If you have 50 portable tool operators, the portable tool expenditures for the year will be 50 operators x \$2,500.00 or \$125,000.00 a year. Correspondingly, if you have 500 operators, \$625,000.00 per year.

The book then proceeds to show that if the factory manager can increase the productivity of 50 operators 20% by giving the tools proper air pressure, he will gain 20% of productivity—20% x \$125,000 a year, in the case of 50 operators resulting in savings from increased productivity, \$25,000.00 per year.

The first practical step covers increasing this productivity by developing proper air pressure delivered to the tools while under load, and shows how to do this. The second approach to getting more from your portable tool dollars is for the maintenance executive to check into the quality of maintenance of portable tools so that when they are on the job they give close to maximum original power. The third approach after existing tools have been

provided with correct air pressures and good maintenance is to examine the individual tools to be sure the operator has the right tool for the job.

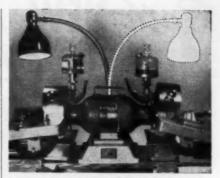
The book does not attempt to examine very large installations or portable tools with resulting large dollar savings, but rather average situations that are practical to the shop man. A section follows on the important subject of safety. Attention is directed to the article, "Power Tools for Tightening Threaded Fasteners," which just recently appeared, and which suggests a somewhat different approach to assembly operations.

The basic purpose of the handbook is to bring to attention the rather substantial sums involved in the over-all portable tool operations and to suggest that while results will be quite large and impressive in the case of large operations, the results in the smaller operations will be just as significant relatively.

AMERICAN STANDARD B5.4-1959—TAPS-CUT AND GROUND THREADS. Approved by the American Standards Association, 70 E. 45th St., New York 17, and published by the American Society of Mechanical Engineers, 29 W. 39th St., New York 18. \$2.50

This new publication includes tap styles, nomenclature and definitions, thread series data, a standard system of marking, and dimensional and tolerance tables for right hand thread taps of the following types: hand, machine screw, spiral pointed, helical (spiral) fluted, tapper, nut, pulley and pipe.

This latest revision incorporates the complete revision of tap standards instituted by the tap manufacturers in 1955. The form of thread profile specified for the taps covered by the standard is that specified in American Standard Unified and American Screw Threads, B1.1-1949.



"Coolie-Grinderlap" by Diamond Tool Company

VIMCO!

CAN BE ADJUSTED

Vimcolights adjust instantly to suit the operator's needs. No screws or bolts to loosen,—then reset. Vimcolights remain rigidly in position regardless of vibrations even on heavy presses and forges. Six standard models are available...send for Bulletin 75. Machine designers send for "OEM Bulletin".

Vimcolights are (U



listed

VIMCO MFG. CO., Inc.

Since 1919
Holland, N.Y.
Use postpaid card. Circle No. 318

# Both NEW and DIFFERENT SHELDON 15" PRECISION LATHES



#### NEW

New. Revolutionary double-box Headstock (Pat. Pend.) New. "WORK-HOLDING ONLY" Spindle.

New. Single-Shift Back Gear Lever on Headstock.

New. Headstock and Apron running in oil.

New. 1½" Hole through Spindle. New. 60-pitch Gear Box with built-in Lead Screw Reverse. New. Amazing LOW PRICE.

#### DIFFERENT

Different. Spindle rigidly held in two large "Zero Precision tapered roller bearings arranged in box-type design.

Different. Electrical switches and push-button stations fully enclosed in built-in well in head-

Different. Two Independent clutches in apron for selecting power feeds.

Different. Cam-action tailstock clamp for rapid release and instant locking of tailstock.

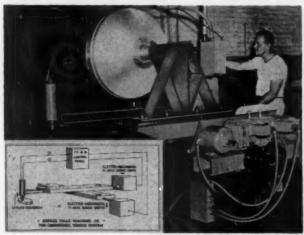
Different. Triple, cogged, V-belt outboard drive—eliminates intermediate shafts—delivers more power to spindle.

This is an all new lathe that bridges the gap between conventional belt driven and geared head lathes. It combines the capacity and power of a geared head with the economy and flexibility of a belt driven lathe. Available with 5', 6' and 8' bed lengths providing 31", 42" and 66" center distances.

tor full information. 8' be	ed lengths providing 31", 42" and 66" center distance
# Gentlemen: Please send me inf	
☐ The NEW and DIFFERENT SHELD ☐ Sheldon ☐ 10", ☐ 11", ☐ 13" Lathes ☐ 11" and 13" Variable Speed	TV
a Larnes	
■ High Speed Turret Lathes ■ Sebastian 13" and 15" Geared	Company Name
Head Lathes Horizontal Milling Machine Sheldon 12" Shaper	Street Address Company .
Name of Local Dealer Have representative Call	City Zone State

## what's new in metalworking





Cutting speed can be varied manually, or automatically controlled.

#### Two Dimensional Tracer System Features Economical Electro-Mechanical Design

A new Two Dimension Tracer System is electro-mechanically controlled and is reported to follow any contour around a 360° path at a constant speed, regardless of direction. The value of the cutting speed can be varied manually. or can be automatically controlled as a function of spindle speed to maintain a constant feed rate in inches per revolution of the spindle.

Electro-mechanical design is said to simplify the tracer mechanism and considerably reduce initial cost as well as maintenance and repairs. The system can easily be adapted to either computer or punched tape control.

The tracer system incorporates a rotating eccentric stylus design. The stylus assembly, on contact with the template, continuously feeds electrical signals to X and Y axis servo drives. These low power signals are boosted to actuate a mechanical amplifier which controls table movement for any value of the X and Y coordinate axes.

Two dimensional tracer is available as a package and can be easily adapted to existing machine tools.

Seneca Falls Machine Co., Seneca Falls, N.Y.

#### Hydraulic Mechanism Resets Die Heads Automatically

A new hydraulic mechanism, designed to reset die heads automatically during operation of 2AB single spindle bar automatics, is said to be capable of handling die heads up to a maximum diameter of 7½". It eliminates time-consuming manual resetting procedures by the machine operator, and, according to the manufacturer, is preferable to mechanical die head reset devices with tool clearance and setup problems.

Powered by hydraulic oil supplied from the main reservoir of the 2AB



For 2AB single spindle bar automatics.

through a special "spider" distributor (for both coolant and hydraulic oil) mounted on the back of the pentagon turret, the new reset mechanism operates automatically during the opening and closing of the machine's hydraulically actuated collet chuck. A closer cam mounted on a small hydraulic cylinder moves forward to actuate the die head reset handle. A specially-designed die head holder is used to accommodate the cylinder and cam.

The unit is designed to reset Landis. Geometric and National Acme die heads. The special die head holder, used to support the actuating cylinder and cam, may be employed for holding bar

tools when the die head is not needed in a particular setup.

The Warner & Swasey Co., Cleveland, Ohio.

Use postpaid eard. Circle No. 167

### Chuck Combines Good Features of Hand & Power Chucks

Claimed to be the first major chuck development in fifty years is announced by The Skinner Chuck Co. This is a principle using the



combination of a pinion, gear plate, screw and wedge. The result is a chuck which combines all the desirable features of hand and power chucks. The company claims this chuck has accuracy within .001 total indicator reading,



Self-locking mechanism prevents chuck opening under load.

repeatability without adjustment within .0005 total indicator reading, unequalled gripping power, and no size limitation.

In operation, the pinion (which can be turned either by hand or by a power wrench) engages the gear plate causing the screw to move the wedge. The action of the screw on the wedge



Cuts 10 Times Faster, Lasts 30 Times Longer

#### STARRETT SAFE-FLEX® HIGH SPEED STEEL BAND SAW

Here is a high speed steel band asw that cuts up to 10 times faster, lasts up to 30 times longer than ordinary blades. New heat treating techniques give it graduated hardness from super-hard teeth to supertough, flexible back. New welding methods make the weld as strong as the parent metal.

Starrett Safe-Flex® High Speed Steel Band Saws have red heat hardness that permits using heavier feeds, higher speeds. They stay hard even at temperatures up to 1100°F. New tooth and gullet design, thinner section, plus sharp, precision cut teeth assure straight, accurate cutting, a fine finish, minimum metal removal. Recommended for all cutoff work on tool and die steels, ferrous alloys and hard-to-cut nonferrous metals . . . also for severing and slicing operations.

Your nearby Industrial Supply Distributor has Starrett Safe-Flex® High Speed Steel Band Saw Blades in regular, skip-tooth and hooktooth types. He also stocks the complete Starrett line of hacksaws, hole saws, band saws and band knives. Call him for quality products, dependable service . . . or write for complete information. Address Dept. B. The L. S. Starrett Company, Athol, Massachusetts, U. S. A.



## Starrett

BAND SAWS • BAND KNIVES HACKSAWS • HOLE SAWS

World's Greatest Toolmakers

Starrett Precision Makes Good Products Better

RECISION TOOLS . DIAL INDICATORS . STEEL TAPES . GROUND FLAT STOCK . HACKSAWS . HOLE SAWS . BAND SAWS . BAND KNIVES

Visit the Starrett Exhibit BOOTH NO. 1256 National Metal Exposition—Chicago



When you dress grinding wheels regularly you clean loaded pores, uncover fresh abrasive grains—GET NEW PERFORMANCE AGAIN AND AGAIN. Dressing makes every wheel more efficient. In the complete Desmond line there is a dresser to meet your requirement—at low cost. A typical Desmond-Huntington dresser\* costs less than \$3.00: replaceable cutter sets average 36c. Ask your Desmond distributor's advice.

The only complete line of grinding wheel dressers and cutters

### Desmond

Desmond-Stephan Mfg. Co.

Urbana, Ohio

Use postpoid card. Circle No. 316

controls the chuck jaws. The force of the wedge on the jaws holds the work with tremendous force.

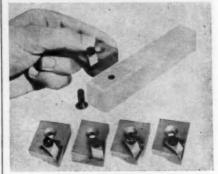
Additional features claimed are: operator protection—an eccentric fail-safe mechanism locks rotation if the shear pin should break, and high chucking speeds—a self-locking mechanism prevents the chuck from opening under any load.

The following sizes are offered—10", 12", 14", 15", 18", 21", 24", 28", 32", 36", 40", 50", 60" and above.

The Skinner Chuck Co., New Britain, Conn.

Use postpaid eard, Circle No. 168

#### Throw-Away Insert For Cast Iron Work



Tool holder attaches to any conventional shank.

The End-O-Con line of disposable Ends was designed for cast iron work, using a chip breaker clamp. This line is said to be very economical, costing less than even a braised tip tool holder. The Ends' disposable turning tool holder attaches to any conventional shank by means of a single screw.

The End-O-Cut line of disposable tool holders is ideal for both cast iron and more difficult turning and facing operations. It uses a throw-away carbide chip-breaker.

The End-O-Con line sells for \$4 each in lead angles of TEAR, TEBR, TEFR, and TEGR.

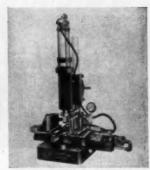
Ends Co., Inc., Indianapolis, Ind.
Use postpaid eard. Cirole No. 82

#### **Fully Automatic Impact Bench Press**

The GTS Pneumark impact bench press, Model 10T, marks identification into steel parts or name-plates. Featured are fast set-up without downtime for adjustment and safe fully automatic operation producing 3000 to 3600 pieces per hour. The unit can be equipped with dial feed with automatic cycling and intermittent movement, as well as stacker feed. Specs.: 10 ton max. stamping cap.; max. die space, 11"; stamps character sizes, 1/16"-1/4"; air line range from 20 to 100 lb.

Geo. T. Schmidt, Inc., Chicago, Ill.

Use postpaid card. Circle No. 83



Press is marking nameplates.

# makes tough grinding jobs Easy!

# BALDOR

MODEL 183-10"

Rugged! Every part oversize to give years of dependable, trouble-free service—even on the most difficult grinding jobs. Ideal for use on large, odd-shaped pieces. Other outstanding features include:

- Rugged ¾ HP Baldor motor won't burnout even if repeatedly overloaded!
- Big %" arbor . . . extra large ballbearings!
- Wide-clearance construction provides more working room!
- Dynamically-balanced rotor plus patented wheel balancing process, reduce vibration to a minimum!
- Big 10" fast-cutting, long-lasting wheels!



Single phase, 3/4, \$162.00 Three phase, 1 HP, \$162.00

#### CARBIDE TOOL GRINDER



Model 153-6". Reversible ½ HP motor, 3450 RPM. 1½" wide wheels. Every part oversize for rugged, longlasting use. Just \$201.80

Write today for Bulletin 321P on complete line of Baldor Grinders and Buffers!

#### BALDOR ELECTRIC CO.

4353 DUNCAN AVE.

ST. LOUIS 10, MO.



# LOWER COST, HEAVY DUTY, PRECISION

For heavy duty precision drilling on drill presses, jig borers, vertical mills, etc., Spiro chucks represent quality at its best.



**PERFECTLY BALANCED** . . . they are completely tested after assembly.

LONG LIFE—made of quality steel that is hardened and precision ground.

QUICK HAND TIGHTENING and RELEASE no key is required.

NON-SLIP GRIP — gripping power automatically tightens as load increases.

**SAVES TIME** — quick hand tightening and release greatly reduce down-time.

Available in five capacities from 5/32" to 5/8" — right hand drive only — for all standard taper shank arbors.

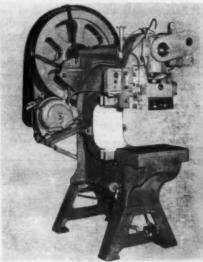


11501 LAMBS RD.

MEMPHIS, MICH.

Use postpaid card. Circle No. 323

Deep Throat Presses Have 30 Ton Cap., 24" Throat Depth



Air cylinder tripping eases operation,

Perkins Machine Co. has added to their line of deep throat presses a 30 ton capacity press with 24" throat depth. This machine is built with a new pitman and ram construction which has a cross bar knockout. The press is equipped with air cylinder tripping for ease of operation.

Perkins Machine Co., Warren, Mass.
Use postpaid card. Circle No. 84



HANDLES AND MOULDS

1, 1½, 2½ and 5 tb. sizes—order your alloy lead hammer requirements from your mill supply house or direct from:

KITZMAN MFG. CO.

Manufacturers Of Lead Hammer Products
15061 Hartwell Ave. Detroit 27, Mich.

Use postpaid card. Circle No. 402

MACHINE and TOOL BLUE BOOK



Use postpaid card. Circle No. 324

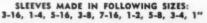
# HOW SQUARE HOLED SLEEVES

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fractions of the property of important.

many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated at pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

wery tew minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.



#### STURDY BROACHING SERVICE, INC.

23516 TELEGRAPH ROAD

SOUTHFIELD, MICH.



#### Automation in the Press Room With Coil Cradle & Oiler Unit

Automation in the press room is easily achieved through use of the Poweroll coil cradle and Clean-Oiler units which are illustrated feeding stock to a power press equipped with an automatic feed. The die itself has a built-in scrap chopper.

The complete coil cradle and oiler unit can easily be moved from one press to another, wherever the advantages of an automatic slack loop and stock cleaning-oiling are desired.

Able to handle stock to 24" wide by 48" dia. and up to 3000 lb. weight, the coil cradle can be loaded by one man in one minute. The metal coil is simply rolled up the ramp onto the power driven rollers.

eliminating need for crane or hoist. There is little danger of slippage or injury to personnel, the manufacturer states.

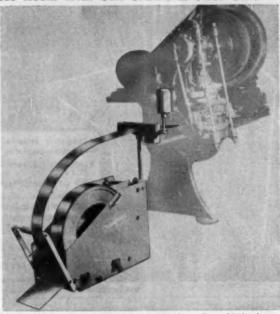
This combination feeds material to the operator, or automatic feed, permitting more efficient work and eliminating fatigue to operator. Spoilage is reported to go down. Abutting the press, and needing no space for the slack loop stored above it, the combination unit saves valuable floor space.

Medelton Co., Inc., Bronx, N.Y.

#### Fully Automatic Circular Saw Cuts Aluminum & Brass Stock

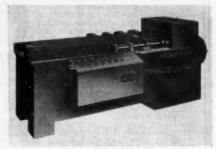
Model V-4 circular saw with fully automatic operation is designed for high production cutting of aluminum and brass extrusions, bar stock and tubing. It has a capacity of 4" x 4".

The machine feeds automatically by



Metal coil is rolled up the ramp onto the rollers. Little danger of injury to personnel.

holes or other characteristics stamped into the materials. Once set the machine is completely automatic, and stops at the completion of the length



Capacity of 4" x 4"

of material being cut. The control panel has manual push buttons for setting up. A cycle is made from one to twenty times per minute. Speed of operation

# NEW! **GREATEST CUT-OFF** CAPACITY IN ITS CLASS!



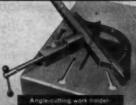
 This newest addition to the Sever-All line of abrasive cutting machines—the Model 2-A-provides greater cutting capacity and more flexibility than any other machine in its class. Check these important advantages:

Big capacity . cuts 4" round or square solids, 51/4" o.D. pipe or tubing, 6"x1" flat stock, 6" angle iron and 8" channels. Cuts practically all metals. Fast operation · ac-

curate cuts at rates of 2 to 3 seconds per square inch. Power oscillation · oscillation is the forward and backward motion of the cutting wheel as it is fed down into the cut. It provides extra cutting capacity, longer wheel life, cooler cutting and reduced operator fatigue. Quality cuts . clean, smooth cuts, require little or no finishing operation. Economy · Sever-All wheels, developed especially for the Model 2-A, provide lowest cost per cut.

#### VARIETY OF WORK HOLDERS GIVES UNUSUAL VERSATILITY







several optional arrangements. These in- and 2-way clamp fixtures above. Screw-type clude the vise-type holder shown on the ma- and quick-action clamping interchangeable.

· Choose the work holders you need from chine at top, plus the V-block, angle-cutting

Write for details on the new Model 2-A Sever-All abrasive cutting machine. Ask for Bulletin DH-299

# ER-ALL CUTTING MACH

Allison-Campbell Division, American Chain & Cable Company, Inc.

937 Connecticut Avenue, Bridgeport 2, Conn.

Use postpoid card. Circle No. 326



el

on

OK

is relative to the length of projection and material being cut. Blade is fully guarded for operator safety.

The 5 hp motor provides power for the 16" circular blade, Rim speed of the blade is 7,000 rpm. Coolant capacity is five gallons, pump capacity four gallons, hydraulic reservoir thirty gallons.

Accessories available include special paint, JIC electricals, JIC hydraulics, hydraulic filter, conveyor tables.

W. F. Wells & Sons, Three Rivers, Mich.

Use postpaid eard, Circle No. 86

#### Straightener For Coiled Stock 4" to 10" Wide, to 1/8" Thick

Enclosed in a steel cabinet base and capable of 20 to 80 feet per minute stockfeed, a new line of stock straighteners holds stock at 40" height. Coiled stock 4" to 10" wide, and .020" to ½" thick is handled. Six models are available with five or seven straightening rolls and with motor ratings ½ to 1 hp. These models may also be used



Five or seven straightening rolls offered on

for straightening blanked parts and for deburring shear-slit stock.

The self-contained, portable unit has



variable speed control which permits setting operating speed at the most suitable point for automatic feed of press. Each model is also equipped with two motor driven pinch rolls, powering all lower rolls, Upper straightening rolls are individually adjustable for proper setting.

H. E. Dickerman Mfg. Co., Spring-field, Mass.

Use postpaid card, Circle No. 87

#### Zinc Alloy Used In Drop-Forming Dies

The Martin Co.'s Baltimore Division is now using Formaloy dies in metal stamping operations which formerly required steel dies. Formaloy is a zinc-base forming alloy produced by Federated Metals Division of American Smelting and Refining Co. (Asarco).

Comprehensive tests reported by Martin's manufacturing research division have shown that Formaloy dies are



STYLE AND SIZES FOR ALL MACHINES ON WHICH THREADS ARE CUT

# This die bead is unique

#### THERE IS NO OTHER LIKE IT

It cuts threads with insert chasers. These are, in reality, small sections of the business end of large and expensive chasers, but with this important difference: their cost is so low they can be even thrown away when dull. For example, for approximately \$50 you can get a dozen sets of insert chasers, each set ground ready to go. Change now to insert chaser die heads and watch your performance improve. "UNIFIED AND AMERICAN SCREW THREAD DIGEST" sent free on request.

THE EASTERN MACHINE SCREW CORP., 25-45 Barclay St., New Haven, Conn.
Use postpoid cord. Circle No. 328

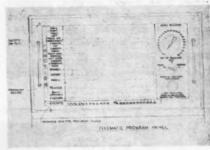
tougher and require less frequent replacement than conventional dies. It was found that Formaloy is readily adaptable for short run operations on steel parts and on aluminum details which involve large quantity runs and difficult or critical sections.

Federated Metals Div., American Smelting and Refining Co., Barber, N.J.

Automatic Cycle Control For 200 Series Hypowermatic

Telematic, a new automatic milling machine cycle control, has been introduced by the Cincinnati Milling Machine Co. for use with their new 200 Series Hypowermatic milling machine. The control panel, a simple peg-board in appearance, controls machine movements plus provisions for auxiliary operations such as fixture clamping or indexing.

To program, it is only necessary to insert pegs opposite the machine function in proper sequence. Trip dogs, positioned on machine table and spindle carrier, then initiate each new action. Up to 24 events can be programmed on standard panels for each automatic cycle. Special panels, such



48 event panel shown.

as 48 event panel shown, can be supplied.

Tracer control can be programmed into the cycle as simply as any other machine function.

Templates can be prepared with holes for only those functions required for a specific job. The template then becomes a record of set up.

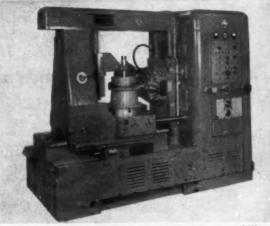
Cincinnati Milling Machine Co., Cincinnati, Ohio.

Use postuaid card. Circle No. 89

#### Knob Controls Hob Spindle Speeds from 20 to 400 RPM

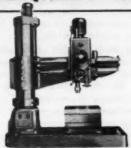
A line of versatile high speed hobbing machines has been added to the Michigan-Lorenz line of hobbers and gear shapers. U.S. modifications of the German Lorenz "F" series hobbers, the line of four basic models combines the high versatility needed for job-lot hobbing with the high output capacity of massproduction type machines.

Hob spindle speeds are reported infinitely variable from 20 to 400 rpm simply by turning



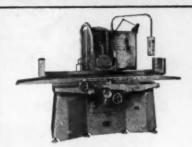
F-Series Michigan F-600 hobber for gears up to 24".

# **HIGHER QUALITY • BETTER SERVICE • LOWER COST**



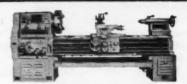
#### CASER RADIAL DRILLS

Column: 8" to 22" diameter
Arm: 2'6" to 8'
Drilling Capacity: 1" to 3-3/16" steel
AVAILABLE ON TRAVELING BASE



#### BLOHM

HYDRAULIC HORIZONTAL SURFACE GRINDERS 12" x 20" to 12" x 64" also 20" x 44"



#### CLOVER ENGINE LATHES

SWING 14" to 27"
DISTANCE BETWEEN CENTERS
40" to 200"
HP 4 to 15
also 12" swing 32" between centers



#### ATOMIC SHAPERS

Stroke: 16", 20", 24" and 28"



#### SACMA UNIVERSAL IRON WORKERS

Shearing capacity in plates %" to 1"

Distributors in Principal Cities
Dealer Inquiries Invited



Exclusive Distributors

#### HERMES MACHINE TOOL CO., INC.

48-15 Northern Boulevard Long Island City 1, N. Y. Telephone: RAvenswood 1-1134

## VERSATILITY



#### DIVIDING HEADS

6½" or 8" swing Swivels in 2 planes Holds work between centers, in chucks and collets.

## ACCURACY



#### 5" MACHINE VISE

Plain or swivel base Precision ground screw V-slides with adjustable gibs Oil hardened and ground jaws

## ECONOMY

Save time and money with Ellis tools. Write:

# NICHOLS-MORRIS

76-G MAMARONECK AVENUE WHITE PLAINS, N.Y.

Use postpaid card. Circle No. 330

a control knob. Designed for automatic cycling, the machines can be operated either as automatic single-cut and two-cut machines, for step-hobbing, and with automatic variation of feeds and speeds within a work cycle.

Two methods for distributing hob wear are offered—continuous hob shifting (diagonal hobbing) and automatic increment hob-shifting.

The closed frame type of construction reduces the amount of vibration in relation to the speed. In addition, the work table slide and overarm support slide are hydraulically locked during the cutting cycle, for maximum rigidity during operations.

Special equipment is made available for specific requirements. This includes special attachments for taper hobbing and for crown hobbing of spur and helical gears.

The various models in this new line are for maximum gear diameters respectively, of 10", 16" (two models), and 24".

Michigan Tool Co., Detroit, Mich.

#### Hammer's Torque Holder Dissipates Shock

A new type of torque holder for soft face industrial hammers has been designed by the engineering laboratories of Nicholson File Co. It features a new shock plate design



which dissipates shock and percussion waves and distributes the striking force equally throughout the hammer.

Named "Stub'n," it is said the holder will not twist or wrench under the most violent blows.

Nicholson File Co., Providence, R.I.
Use postpaid card. Circle No. 169

#### Three New Models of Mikemasters

Three new models of the Mikemaster have been developed. This instrument enables operator to frequently check his mikes, and other OD measuring tools, to assure accuracy of reading. Three new models are offered: Model M-1 is in even inch steps, from 1" to 6". M-1½ is made in steps of ½", with a range of ½" to 6½" so mikes may be checked in the range in which they receive the most wear. M-2 is used to check the 0-1" instruments, in steps of 100".

Size Control Co., Chicago, Ill.

Use postpaid eard, Circle No. 91





Unisorb pads and leveling mounts are the nearest thing to money in the bank every time you install a machine!

#### Here's How . . .

- . No floor drilling, bolts, lag screws or grouting required
- Material and labor costs actually cut from 30% to 75%
- 80% saving in time
- · Positive, safe and secure mountings but always mobile
- Eliminates up to 85% of transmitted vibration and noise. Cuts repairs, improves production. Machines work better, last longer.

GET THESE SAVINGS on your next machinery installation. Send for new Unisorb Bulletin and details on Money-Back Trial Offer, NOW.

# UNISORB

Division of The FELTERS Company

203 South St., Boston 11, Massachusetts



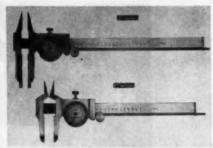
1133451	long it lasts. Get yours today in bothoil and grease consistencies,
a reger 1	TRIAL ORDER-
TWO FO	OUR OZ. TUBES \$1.00
	y order of CMD right away! Bill my company
Company N	Name
Address	
City	State
Chicago M 1906 W	danufacturing and Distributing Co. Vest 46th St., Chicago 9, Illinois
	O MANUFACTURING

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#### Direct Dial Reading Caliper Measures Accurately to .001"

A newly designed caliper's direct dial reading is said to permit measurement accuracy up to 0.001—which can be read directly from the dial without verniers or other auxilary scales. The caliper is available in 0"-6" or 0"-8" models. The double jaws permit inside, outside or depth measurement with equal convenience. The jaws can be locked in position if desired.

The tool is made entirely from stain-



Double jaws permit easy inside, outside or depth measurement.

less steel and brass. All operating components are completely enclosed, eliminating malfunction and error caused by dirt or foreign material.

All tools are supplied in a leather case. The 6" model sells for \$39.90; the 8" for \$42.00.

Titan Tool Supply Co., Inc., Buffalo, N.Y.

Use postpaid card. Circle No. 93



#### DRILL and PILOT BUSHINGS

Frictionless
—Rotary
For core drilling, T.
C. and high speed
boring, turret tool,
piloting, etc. Won't
stick or clog. Dust
proof as a watch.
Write for details.

GATCO ROTARY BUSHING CO. 42330 Ann Arber Road, Plymouth, Mich.

Use postpaid card. Circle No. 333

MACHINE and TOOL BLUE BOOK

#### Continuous, Tape-Controlled Milling in Three Dimensions



Operator need only push button to start tape, change tooling as required, set spindle speeds.

Continuous automatic milling of regular and irregular shapes in three dimensions to a high degree of accuracy, under the direction of tape-reading numerical control, is accomplished by the new Numeric-Keller machine, according to Pratt & Whitney Co. Many of the construction features of the

# CVA Lathe Chucks

d

r

ONE OF ENGLAND'S



#### 3 JAW GEARED UNIVERSAL SCROLL

with average guaranteed accuracy of

.002" three inches from the jaw face

AND OTHER GREAT FEATURES INCLUDING: ONE PIECE BODY • FLAME HARDENED JAW WAYS • INDUCTION HARDENED SCROLL FORM • SUPPLIED COMPLETE WITH TWO SETS OF JAWS AND CHUCK WRENCH

Size	Weight	Dia. of Bore	Price'
31/4"	6 lbs.	5/8~	\$34.00
436"	6 lbs.	1-1/8**	34.00
534"	11 lbs.	1-1/2"	40.00
614"	16 lbs.	1-11/10"	46,50
736"	26 lbs.	2-1/4"	55,00
9"	38 lbs.	2-3/4"	70.00
10%"	68 lbs.	3-1/2"	88,00
12"	106 lbs.	3-7/8"	115.00
		warehouse, N. 3	_

Back plates available at extra cost.

Superior chucks produced by an English manufacturer famous for precision built machine tools, representing unbeatable values. Certificate supplied with every chuck attesting to and guaranteeing accuracy. All parts guaranteed for a year against defective workmanship and materials. Repair parts available. We also stock
4 JAW
INDEPENDENT
LATHE CHUCKS

AND FOR BOTH 3 AND 4 JAW CHUCKS

- Direct mounting for American long taper spindle nose.
- Direct mounting camlock fitting.

ALL IN STOCK FOR IMMEDIATE DELIVERY!

Write us for complete new lathe chuck catalog

MANHATTAN SUPPLY CO., 151-A GRAND STREET, NEW YORK 13 . CANAL 6-4992

P&W Keller tracer-controlled milling machines have been combined with the Bendix tape control system in the new machine. In contrast to tracer-controlled milling, however, the new machine eliminates the need for templates, models and complicated fixtures, with resultant savings in tooling and production lead time.

In this machine the horizontal and transverse movements of the table on which the work is mounted, the vertical movement of the cutter spindle, and the feed rates, are automatically controlled by punched tape. The operator is required only to push the button to start the tape, change the tooling as required, and set the spindle speeds. The machine is ideal for both short and long run production, particularly in tool and die plants.

Power for all three movements is

furnished by a hydraulic system which generates 1500 psi and delivers 7½ hp to any of the feed motors.

Versatility, rugged construction, and extremely accurate alignments are features reported for the machine. It is capable of very heavy and very delicate work—under tape direction—with 18 spindle speeds ranging from 40 to 3600 rpm. Table travel is 36" horizontal and 12" transverse. Vertical slide moves 22". Table working surface measures 48"x30".

Built-in control devices in the form of automatic error-detecting circuits and continuous digital feedback controls automatically shut down the machine if any malfunction is detected, or adjusts motions if errors occur.

Pratt & Whitney Co., Inc., West Hartford, Conn.

Use postpaid eard. Circle No. 94

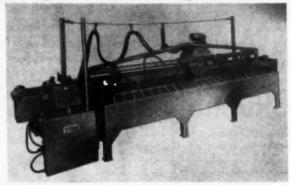
#### Power Setting of Radial Height in Traverse Cutting Machine

Stone Machinery Co. announces a new traverse type metal cutting machine, the SS-100-LR, which features power raising and lowering of rails to quickly obtain correct wheel arc of contact for any thickness of sheet and plate stock.

Pushbutton control at central panel achieves change-over in minimum time. Rails on the model are adjustable from 2¼" to 7¼" above

table top. Precise adjustments are then afforded by independently raising or lowering cutting head from control panel. Standard 12" blade is powered by 10 hp continuous duty, geared-inhead motor.

The flexibility of vertical positioning is said to provide maximum wheel efficiency, increase wheel life and faster



Pushbutton control at central panel achieves change-over in minimum time.

positioning for step-and-repeat cuts.

The manufacturer states that his machine cuts ferrous and non-ferrous sheet and plate stock at high rate of speed (3" aluminum alloy plate at 18" per minute) and to exceptionally close tolerances.

Stone Machinery Company, Manlius, N.Y.

#### Experience—the added alloy in Allegheny Ludium tool steels



Careful addition of sulfur to melt guarantees typical sulfide distribution, as shown in photomicrograph of longitudinal specimen of EZ MACHINING tool steel.

# Sulfur addition to melt held to narrow range in Allegheny Ludium's EZ MACHINING GRADES

Uniform, finely-distributed sulfides mean uniform machining, uniform high finish, uniform long tool life order after order

Adding sulfur, actually an impurity, to a tool steel melt to make it free-machining must be done with care and precision. That's why Allegheny Ludlum maintains an extremely close average range in adding sulfur to its EZ MACHINING grades. But mere range, however narrow, is not enough. A-I. has developed special techniques in adding sulfur and nucleating agents to produce the uniform, finely-distributed sulfides that characterize good free-machining tool steels.

A-L's extra care means you can standardize your machining operations from piece to piece and order to order. This reproducibility is reflected in uniform mathining; uniform high finith; uniform long tool life.

For example, in the production of hobs these machining properties in Allegheny Ludlum's EZ MACHINING steels minimize the costly "backing off" operation for back clearance of multiple teeth, eliminating complicated extra heat treatment. Lower residual stresses are set up, because the steel has a lower resistance to the cutting action. Naturally, hobbing is only one of the situations where these free-machining characteristics can benefit you.

Allegheny Ludlum stocks a complete line of tool steel sizes and grades. Call your nearest AL representative, you'll get quick service and counsel on such problems as heat treating, machining, grade selection, etc. Or write for A-L's publication list which gives full data on the more than 125 technical publications offered. They'll make your job easier.

ALLEGHENY LUDLUM STEEL CORPORATION, Oliver Building, Pittsburgh 22, Pa. Address Dept. MB-23

W9W-7196

#### **ALLEGHENY LUDLUM**

Tool Steel warehouse stacks throughout the country... Check the yellow pag every grade of tool steel... every help in using it



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#### PRESS ROOM EQUIPMENT

#### WIRE STRAIGHTENERS

Takes round or flat wire and tubing. Rolls adjustoble by means of socket set screw. For use with automatic Slide, Roll or Hitch Feeds. Units available with 5, 7, 9 or 11 grooved rolls.



#### MOTOR DRIVEN STOCK STRAIGHTENERS

For all thin materials. Entering rolls power driven; top rolls ore individually adjustable for stock thickness. Available in eight sizes.



#### SWEEP GUARDS

A positive safety guard on power presses. Easily installed. Downward motion of rum removes operator's hands. Rugged-withstands jurring impact of press. Needle bearings in guard housings assures long life.

Write Now for new catalog showing prices and complete line of Equipment.



## DURANT Tool Supply Co.

7 Thurbers Ave.

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#### Three Cutting Edges On New Type Cut For Burs

A new type cut for burs, called Dia-Mo Cut, is reported to have many advantages over the ordinary Diamond Cut previously furnished, in providing a tooth form with three cutting edges. By controlling depth of flute, both



Three cutting edges on bur afford longer tool life.

left and right, and a definite ratio between left and right flutes, a threesided tooth formation results, instead of the pyramidal type tooth of the Diamond Cut pattern.

Longer tool life, practically eliminating bur climbing, and increased cutting action are reported.

The design is especially adaptable for burring heat-treated, alloy and stainless steels.

615 different bur sizes and types in standard, fine and coarse cuts have this new type cut.

The Atrax Co., Newington, Conn. Use postpaid card. Circle No. 96



#### NOW-Polish Plastic Molds-Lap Carbide, Dies & Tools-With Low Cost Tetrobor

· Tetrabor is an oil paste of boron

carbide especially compounded for lapping carbide tools and dies.

CUT LAPPING COST — Tetrabor costs much less than diamond.

INCREASE PRODUCTION—Faster acting Tetraber permits its use in place of conventional compounds, Gives superior finish.

superior finish.

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free literature and price list. Dealer
inquiries invited.

TITAN TOOL SUPPLY COMPANY, INC. 1419 Hertal Avenue . Bax T Buffalo 16, New York

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MACHINE and TOOL BLUE BOOK

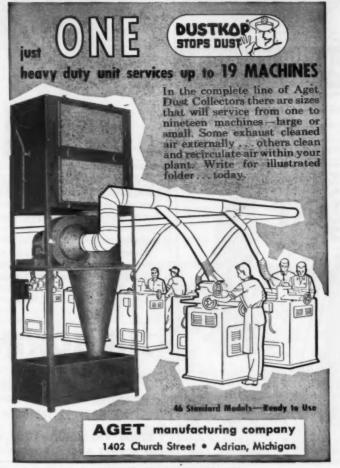
Heavy Duty Line of Unitized Tooling

A new complete standard heavy duty line (Series HD) of unitized tooling has been designed for perforating various materials up to ¼" mild steel or its equivalent in tensile strength. Alloy steel holder provides crush-proof die seats and permits use of the SKINHRD guide hole, introduced for the first time in TPC unitized tooling. Built-in lubrication is also featured. Unit bottoms are guaranteed flat and square with the centerline of the punch, insuring accurate location of perforation.

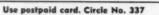
Tool Products Corp., N. Tonawanda, N.Y.



Built-in-lubrication,









Use postpaid card. Circle No. 338

#### Safety Features of Punch Press

A new eight-ton Electro-Safe punch press is described by Kenco Manufacturing Co. engineers as the safest press on today's market.

Using the press for single-trip operation, the operator must depress two widely separated hand controls, and



Either mechanical or electrical press failures are said to fail safe.

hold until the ram reaches the bottom of the stroke. The operator cannot fasten one control in the "down" position—both must be depressed and released to complete a stroke.

Flywheel-in-motion and clutching mechanism hazards are eliminated by use of a high-starting torque motor which delivers power to the crankshaft. A heavy-duty brake is applied

# **JIG BORING**

and
Large Precision Machining
Done to your specifications
WE HAVE 22 JIG BORERS

KIDDE PRECISION TOOL CORP.

Use postpaid card. Circle No. 339

MACHINE and TOOL BLUE BOOK

automatically in power failure. In addition, a button stops the press instantly at any point in a stroke.

An electronic switching arrangement permits cycling the ram to start and stop in any position, or as often as desired in any one cycle.

This press is useful in trimming. forming, drawing, embossing, coining, staking, and assembly.

Kenco Manufacturing Co., Los Angeles, California.

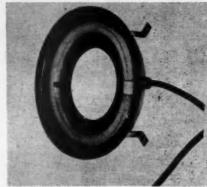
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#### **Lights Directly Into Work** Without Any Shadows

Standard Boring Mill Lite offers maximum visibility with light directed right into the hole, without shadows, on machines such as boring mills and drill presses.

Metal brackets permit speedy installation around the work spindle. Aluminum housing is reported to make the unit corrosion free, easy to wipe clean, and lightweight. Low voltage operation-on any standard 110-120 volt, 60

cycle supply-affords maximum operator safety.



Metal brackets permit quick installation.

Model 12, with 12" circline fluorescent bulb, 32 watts, is priced at \$14.00; Model 16, 16" circline fluorescent bulb, 40 watts, \$15.00.

Standard Boring Mill Lite Co., Detroit, Mich.

Use postpaid eard. Circle No. 99

# 1 MAN+1 BENDER

BENDS ALL THESE:

Wrenchless, ready to use. Practical, quickly set up. Adoptable, replaces special equipment. Versatile, 147 different dies available. Dependable, a must for maintenance, limited production. Invaluable, optional equipment makes jobs

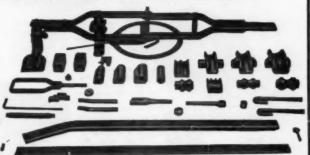
#### HOSSFELD UNIVERSAL® IRON BENDER



ROUNDS FLATS SQUARES

ANGLE IRON

TUBING & CONDUIT



Bender Shown With Regular Equipment

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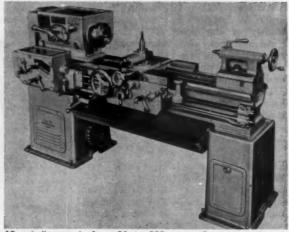
402 W. Third Street, Winona, Minnesota

#### 16" Geared Head Engine Lathe Features 5 HP Motor

The 5 hp motor of the 16" engine lathe is conveniently mounted in the cabinet leg with multiple vee belt drive to headstock vee pulley. The all-geared headstock offers twelve spindle speeds, ranging from 20 to 900 rpm, obtained through two speed handles. A new improved friction type clutch and brake affords instant spindle control, allowing the motor to run continuously. The quick change gearbox is furnished with 48 separate threads and feed.

Featured also are separate lever type longfeed and crossfeed positive clutches, with reverse mechanism for both feeds operated by a lever.

An 18" lathe is also manufactured.



12 spindle speeds from 20 to 900 rpm; 48 separate threads and feeds.

Both 16" and 18" lathes are available in short, medium or long bed lengths. Carroll-Jamieson Machine Tool Co., Batavia, Ohio.



BEVERLY SHEAR MFG. CO., 3005 W. 111th St., Chicage 43, III.
Use postpoid cord. Circle No. 341

# there's a place for PRESSURE BLAST in your plant

Rough cleaning problem? Parts delicate or intricate in shape? Micro-inch finish requirements close? Pressure Blast removes scale, oxides and all types of discoloration without stock removal. Delivers RMS readings as low as 6.

Hand deburring sending costs up? Pressure Blast can do the job! Regardless of burr location or size, type of metal, if it's a true burr and not extruded, Pressure Blast can handle it.

Having difficulty preparing surfaces for plating? Pressure Blast offers

basis metal cleanliness and microscopically etched finishes for strong mechanical and electro-chemical bond.

And that's not all...with Pressure Blast you can reduce die and mold maintenance costs, hone HSS and carbide cutting tools for longer work life, increase lubrication retention of bearing surfaces, blend tool marks and hundreds of other cost-cutting applications.

Pressure Blast abrasives for all types of wet blast equipment:



November, 1959

195

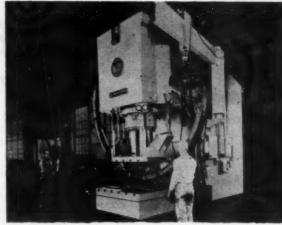
## Hydraulic Press Forms 71/2" Bar Stock

An 860-ton hydraulic gap frame press is used by Pennsylvania Engineering Corp., New Castle, Pa., for forming operations on plate up to 5" thick, and on bar stock up to 7½" square.

A special feature of the press is a pendant control which makes it possible for two men an operator and a loader to run the press with ease. With this control, the operator can assist the loader, then reach out to the hanging con-

trol and operate the press.

Other features of the press include: forged steel cylinder; 60" throat depth;



Forming half of a rim out of bar stock 71/2" square, 24' long.

48" x 48" ram plate, and a bolster plate 72" x 84".

E. W. Bliss Co., Canton, Ohio.



#### **Cutting Tool Holders With Throw-Away Inserts**

A new DeVlieg development, which combines specially designed Microbore cutting tool holders with Kendex mechanically held throw-away inserts for the cutting edge, is well suited for rough cutting. Inserts can be provided in the hardest grades of carbide because no brazing is required. Inserts are triangular and can be indexed from tip to tip. When expended, the insert is thrown away.

Microbore Div., DeVlieg Machine Co., Royal Oak, Mich.

Use postpald eard. Circle No. 182



Microbore - Kendex throw - away inserts: screw-on type (left); clamp-on type (right).



Ask your mill supply house or Maxwell salesman or write today for CATALOG BB-159 Greater accuracy, more work in less time, longer tool use—you get them all with Maxwell's new Mastur Boring Head line.

Adjustable to 0.0001-inch, Maxwell's new improved boring tools feature an adjusting-screw head graduated for readings in thousandths, with body having vernier readings of 0.0002-inch. Four standard models for tools 36" to 1" diameter, and up to 3" in specials. Boring range from 36" to 15". AA-setz

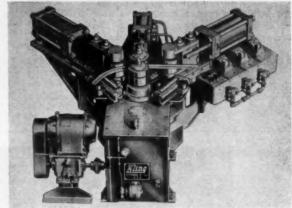
MAXWELL INDUSTRIES, INC.
493 East 5th Avenue · Ashtabula, Ohio

#### **Bouble Pinch Angle Roll Eliminates Flat Ends**

The horizontal hydraulic double pinch type angle and structural bending roll permits elimination of 90% of the flat ends which are otherwise unavoidable in angle bending, it is claimed of this new development. An operator may bend a steel section completely around the center roll.

Hydraulic pressure provides tremendous bending force and at the same time affords maximum flexibility and ease of control. Construction

features the movement of pinch rolls and gauging roll by means of heavy duty hydraulic cylinders, Control levers actuate leakproof pressure flow valves, which gives the operator control of the rolling operation at all times.



Hydraulic pressure provides great bending force, with flexibility.

A two stage high-low pressure pump enables the rolls to be brought into operation quickly.

Kling Brothers Engineering Works, Chicago, Ill.





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# SENTRY HARDENING

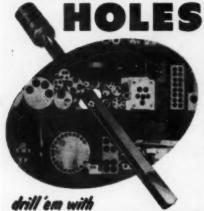
Sentry performance — consistency, low cost, high quality — is the best proof that you need a Sentry furnace. Without reservation, you can entrust your valuable high speed tools to the Sentry Diamond Block Atmosphere. All steels hardening above 1750°F can be soaked to ensure maximum hardness without danger of scale or decarburization. Surface spoilage is positively eliminated. Send us your high speed or high carbon high chrome tools and dies for free demonstration hardening.



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Request Catalog T-32. Write THE SENTRY CO., FOXBORO, MASS.

# better, faster, more economical



# ELDORADO GUN DRILLS

When you drill holes with ELDORADO production proved DRILLS, you solve 'hole' problems in a single operation... assure straightness, micro-finish, perfect size, absolute roundness and precision tolerances. Drill practically any material. Put ELDORADO DRILLS to work on your 'hole' problem, today.

Order from stock or send in your specification. Write for literature.

#### SPECIFICATIONS

IN STOCK FOR INNEDIATE SHIPMENT		
Sizes 1/4" to 1/2" dia. 1/2" to 1/4" di in 64ths in 32nds		
OA Longths	10", 16", 22", 36"	16", 22", 36"
Drivers	.750" dia. x 2¾" long	1" x 234" long
Tips	Carbide	Carbide

MADE TO YOUR SPECIFICATIONS	
Sizes	.1250" to 2" dia.
OA Longths	4" to 120" with dia. limits
Drivers	To fit your need
Tips	Carbide



Specializing 100% in GUN/DEEP HOLE DRILLS and Related Tools.

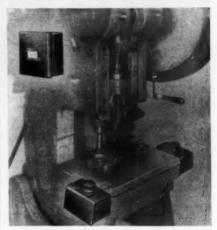
ELDORADO TOOL & mfg.

338 Boston Post Road . Milford, Conn.

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#### Two Hand Press Control For Safety on Power Presses

The Durant Ambi-Trip two-hand press control is designed to keep both hands of the operator safely away from the stroke of the power press ram. It is said to energize the solenoid of



Buttons will not trip press, when unit's switch is off.

a press-clutch only if both push-buttons are simultaneously pressed. When the Ambi-Trip switch is off, the buttons will not trip the press.

The electro-magnetic unit can be set to operate a single stroke or continuous press.

Durant Tool Co., Providence, R.I.

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In Stock—Immediate Delivery

Gears, speed reducers, spreakets, thrust hearings, flexible couplings, pulleys, ets. A complete line is carried in our Chicago steck, Can also quote on special gears of any kind. Seed is your bluoprists and

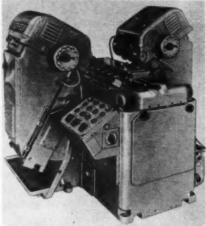
Send for Complete Catalog No. 18a CHICAGO GEAR WORKS 440-50 N. Oakley Blvd., Chicago 12, III.

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MACHINE and TOOL BLUE BOOK

# Cutters Produce Racks For Office & Tool Machinery

Cosa Corp. has recently introduced the Koepfer rack cutters to their line of specialized automatic production



Built-in selector panel controls operations.

machines. These cutters are said to automatically and economically produce racks for all types of office, tool and scientific machinery, from typewriters to electronic computers.

Two models are offered—the 205 and the 210 with one or two cutting heads. Model 210 has a larger cutting length. A second cutting head may be added at any time to double production rates. Various cutting tools are available, from a single, to a gang of annular form cutters. Capacities are limited only by size of cuts being made in the workpiece.

A built-in selector panel controls operations. The built-in, quick-set indexing device is said to retain extreme accuracy through long production runs.

Spindle speeds are adjustable from 80 to 645 rpm. Maximum cutting length on the 205 is 20"—on the 210 model, 40". Maximum cutting width is 4".

Cosa Corp., New York, N.Y.

Use postuaid eard. Circle No. 105

# **COMMANDER TAPPERS**



Range: 0-80 to 16 "-16









Pressure Sensitive Drive Range: 0-80 to 10-24

# a Type and Size for Every Job!

STANDARD
TAPPER

Adjustable
Torque Control
Range: 0-80 to 34"-16

Commander Tappers are made in 10 models—each designed to handle tapping jobs over a wide range. From the Commander Tapper line, you can select the right unit to give you the exact performance your job requires. Whichever Commander Tapper you select, you will get

unequalled performance and tapping economy. Sold and serviced by drilling and tapping specialists. Write for the Commander Production Tool Catalog and name of nearest Distributor.

Communated MFG. CO. 4227 W. KINZIE STREET CHICAGO 24, ILLINOIS

6" x 18" Surface Grinder Offers 161/2" Vertical Capacity

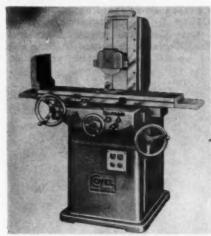
The completely new No. 10H 6"x18" hydraulic surface grinder features 16½" vertical capacity from a full 7" dia. wheel to top of the table, and infinitely variable cross feed range from .005" to .250" with rapid traverse for dressing the wheel from the chuck or quick positioning of the work. Other advantages the manufacturer reports are power elevation for rapid positioning of the grinding wheels, and inverted vee cross ways.

The importance of the hydraulic high speed table is said to be the reduction of grinding costs and heat distortion. The hydraulic power feed unit is direct-driven by ½ hp 3450 rpm motor.

Convenient controls include a Selecto valve for manual or automatic feed, table speed control, and graduated knob to set amount of cross feed.

Over-all size of the table is  $9\frac{7}{8}$ " x  $44\frac{1}{4}$ ".

Attachments include wet grinding attachment, coolant through the wheel,



Hydraulic high speed table reduces grinding costs.

power elevation, dust exhaust system, etc.

Covel Manufacturing Co., Benton Harbor, Michigan.

Use postpaid eard. Circle No. 106

TURN-

MAX. CAPACITY
SO X 100 IH.
MIN. BREAKING CAP.

BOUT YOUR DIE WITH EASE

- SAVE MOUNTING TIME
- PREVENT HAZARDS
- REDUCE COST

PATENTED

Punch holder and die shoe can be rotated 360° separately, for fast mounting of die sections. Lifting force is equal due to adjustable turnbuckles, thus keeping die set parallel for better alignment and fast trouble-free separation of die set.

. . 3 - 3151

TURN - ABOUT DIE HOIST CO.

604 NORTH HARTREY

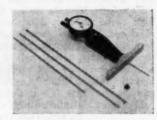
EVANSTON ILLINOS



#### New Features of Depth Gage

Two new changes have been provided for the recently-announced Mueller depth gage. It can now measure tapers with a special taper alignment. Also, by simply adding a measuring ball it becomes a pin gage. As previously announced, its dial indicator accurately measures the travel of a footed rod, direct measurements being obtained for both the location and width of the groove in one simple operation.

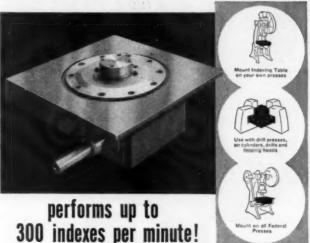
Mueller Gages Co., Pasadena, Calif. Use postpaid card, Circle No. 107



Toper attachment offered.

Economical, Versatile, Absolutely Accurate Automation!

# Federal Dial Feed Indexing Table



Federal Dial Feed Indexing Table performs hundreds of operations that formerly required specialized, highpriced equipment. Use on your present equipment, on Federal Presses, or independently with air cylinders, drills and tapping heads, or drill presses. Performs up to 20 multiple station operations - delivers up to 300 indexes per minute. The savings are almost unbelievable. Cam-type indexing mechanism assures perfect accuracy-smoothest operation. Write today for complete information.

Federal Press Company, 910 Division Street, Elkhart, Indiana FEDERAL Juliable PRESSES

35 Years of Quality Construction

High Speed Exhaust Shell For Standard Mistkops

The Aget Manufacturing Co. announces a new high-speed exhaust shell which fits all standard Mistkops. The shell, which speeds up filter change, is made of heavy gauge steel, enameled in grey tone. The top of the shell is equipped with quick action clamps for fast removal. With the top removed, the old filter can be removed and a new one inserted in a few minutes.

The Aget Manufacturing Co., Adrian, Mich.

Use postpaid eard, Circle No. 108.

Speeds up filter change.



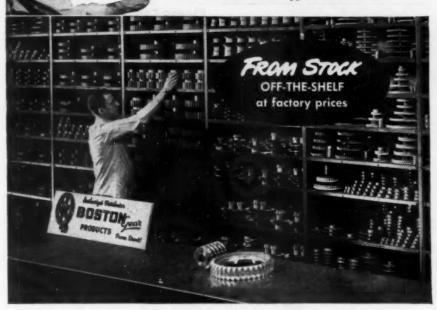


Why slow up the job with specials?

Design around STANDARDIZED

## **BOSTON GEARS**

- over 2000 types and sizes



Brass, steel, iron
and non-metallic
SPUR GEARS
RACK, PINIONS
PINION WIRE
BEVEL and
MITER GEARS
WORM GEARS
and WORMS
SPIRAL MITER GEARS
HELICAL GEARS

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Your nearby BOSTON Gear Distributor has the gears you need, ready for prompt delivery. There is nothing finer than BOSTON Gear quality, and you save time and money in planning and production. Boston Gear Works, 81 Hayward St., Quincy 71, Mass.

TOUR BOSTON POUR DISTRIBUTOR



COLD FORGED STAINLESS STEEL SOCKET CAP SCREWS. The company reports this recently introduced line features extra strength—can be re-applied many times; ideal grain flow—takes greater tightening torques; clean chip-free sockets—for easier, faster driving, and rolled threads which afford perfect fit. In numerous sizes in the new A.S.A. 60 series or the old series. Set Screw & Mfg. Co., Bartlett, Ill.

Use postpaid card. Circle No. 109

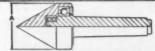


#### LIVE CENTERS



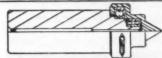
LIVE CENTERS

Head No.	Morse Taper	Price
2	2	\$28.00
3	3	32.50
4	4	40.00
5	5	52.00
6	6	75.00
7	7	265.00



TURING CENTER SPECS

Hd. No.	"A"	Morse Taper	Price
2	17/8"	2	\$32.00
3	236"	3	40.00
4	23/4"	4	43.00
5	31/4"	5	57.00



STRAIGHT SHANK CENTERS

Hd. No.	Shank Size	Price
3	1"	\$40.00
4	11/2"	53.00
5	13/4"	65.00
5	2"	75.00
6	21/2"	85.00

Head of any other size and shape can be furnished to specs. Standard shanks made with Morse tapers, other tapers special, always specify Head and Taper—4-page catalog on request.

STURDIMATIC TOOL COMPANY 3970 F St., DETROIT 16, MICH.

Use postpoid card. Circle No. 354

#### Planer Conversion For Effective Metal Removal



Two-speed milling head using carbide tooling.

The Veet Speedmiller, a high hp milling head, especially designed for machine conversions, possesses all the features needed for a milling head to use carbide tooling. The manufacturer further states it is a two-speed milling head rated at 30 hp at 900 rpm and 15 hp at 450 rpm. As a two-speed unit it is capable of milling all grades of steel and cast iron.

Reported as providing savings and increasing production, the Veet planer conversion is designed for slab milling of plates, machining fabrications, steel castings or iron castings, etc.

Machine changes required are providing milling feed rates for the table and motorizing the cross rail.

Veet Industries, East Detroit, Mich.
Use postpaid card. Circle No. 170

Cast-Iron Sections For Jigs and Fixtures

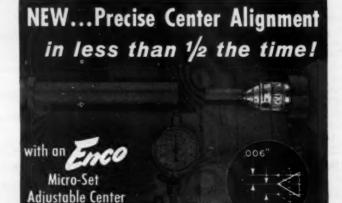
Standard Micron cast-iron shapes are now available for the economical building of small jigs and fixtures. Shapes include U's, T's, H's, hollow squares, rectangles, flat plates. Sizes range from 3" to 8" and lengths of 25", which are cut to order. These sections give a rigid structure for making drilling and milling jigs without welding and with a minimum of machining. They are made of high tensile strength cast iron with all outside surfaces machined square and parallel within .005" per foot.

Ex-Cell-O Corp., Detroit, Mich.

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Basic structure of this jig is a Micron U-section. After part is inserted and clamped, jig is turned over and bushings inserted for drilling.



End hit or miss center alignment
 without shifting tailstock or table

- Tip adjustment calibrated in increments of .0005"
- Provides micrometer control when used for straight or taper work
- Ideal when working on shafts or mandrels
- Replaceable carbide tip
   Saves costly setup time

With an Enco Micro-Set Adjustable Center, any operator can precisely align his work piece in a matter of minutes. Soon pays for itself in time and scrap savings. Try one and you'll see why they are called "the most valuable turning or grinding accessory to come along in years". Available in popular Morse, Jarno and B&S tapers.

Write for complete catalog and nearest distributor.

Enco also manufactures a complete

line of Precision Lathe Turrets and Tiny-Titan Magnetic Base Holders.

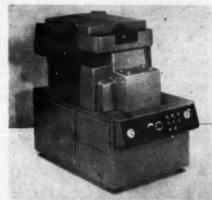
DEPT. NO. 2119 • 4520 W. FULLERTON AVE. • CHICAGO 39, ILLINOIS

# Grinding Machine Points Drills From .032 Through 1.50 Dias.

Model 100 Winslo-Matic Drill Pointer, for pointing drills from .032 thru 1.50 diameters, produces automatically and with precision the Winslow Type 4 drill points or other helical (self-centering) points, as well as conventional points. Drill points are concentric within .0002. Four different power-operated work-heads are available and are quickly changed to accommodate the range of the various drill diameters. The drill point is formed on a 20" diameter grinding wheel.

In addition to all standard drills, the drill point on most drill countersinks can be sharpened with this machine. Production rate is variable for sizes and types of drill material. A pacesetter adjuster sets interval between cycles.

One of the features of the machine is the fully automatic, self-compensating wheel dresser. Quantity of drills pointed between wheel dressings is provided by a selector switch, Indexing is controlled at the point of the drill



Features fully automatic, self-compensating wheel dresser.

so that no adjustment is required for variations in drill length.

Winslow Product Engineering Corp., Arcadia, Calif.

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#### INDEXING MACHINERY — CAMS — GENEVA GEARS — TURNTABLES

EISLER MAKES OVER 300
DIFFERENT TYPES OF
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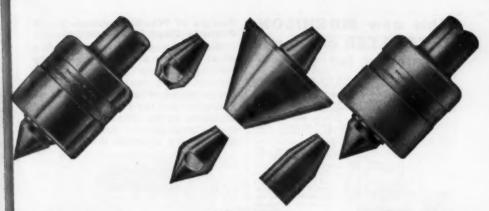
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- · the only complete line
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INTRODUCING J & 5 Tool Company's complete new line of live centers with accuracy better than .0001", with these features:

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- Correct capacity rating.
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J & S TOOL CO., INC., ALSO MANUFACTURERS FLUIDMOTION WHEEL DRESSERS CLAMPS ● NO-BEND MILLING ARBORS AND CLAMPCUT MILLING VISES

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built with machine tool accuracy. Practically anyone can operate it. It has automatic feed, automatic stop to cut off feed at given depths, automatic relief to back the work cway from cutters, automatic centering, automatic lubrication. NO BUSHINGS REQUIRED. Cuts keyways 1/16" to 1". FREE new Catalog 714-A shows all features and specifications can be had by writing:

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### HIGH SPEED PRECISION DRILL



MODEL AF-7B
For
precision drilling
from #0 to 5/16"
diameter drills

Drills to the center of a 1134" circle. Vertical travel ahead: 8". Spindle travel: 234". Speeds: 750, 1500, 3000, 6000 RPM. Spindle chuck indicated and guaranteed to .00075".

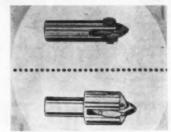
Model US and R-53 sensitive drills also available

HIGH SPEED HAMMER CO., INC.
311 Norton St., Rochester 21, N. Y.

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#### Design of Wheel Dresser Permits Good Heat Control

The "Economy" disc type grinding wheel dressers are said to increase grinding efficiency by lowering grinding heat. Small, elongated selected diamonds are mounted in a steel matrix. The metal has the same coefficient of expansion as the diamond and bonds to it. The shape and mounting of the diamond are reported to keep the



Dressers never require resetting.

dresser sharp over its entire life. Dressers are also said to never require resetting.

The three models listed include: No. 60-4-1, for toolroom surface grinders, No. 13 Brown & Sharpe universal, Landis 4M grinders, priced at \$18.00; Model No. 1-6-1, for Cincinnati centerless (60 grit and finer), all tool grinders, \$28.70, and No. 15-6-1, for Cincinnati centerless (coarser than 60 grit), large O.D. grinders, large surface grinders, \$48.40.

Precision Diamond Tool Co., Elgin, Ill.

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Wilmerding, Pa.

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MACHINE and TOOL BLUE BOOK

### Pre-Decorated Steel Processed In Continuous Coil

A process for bonding a highly decorative, abrasion-resistant plastic coating to long, continuous coils of strip steel has been developed. This type material was available formerly only in cut sheets. Besides being abrasion-resistant, it is also reported unaffected by acids, chemicals, and fumes. Presently offered in widths up to 32", a 48" width will soon be available.

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DC

BOOK

Despite being pre-decorated, this

material, called Miracoil, can be subjected to the same end-product forming operations as un-coated steel. It is said to be able to take any pattern which can be photographed—any color, wood grains, leather, marble, and other special effect patterns.

A major TV-set manufacturer is already using this pre-decorated steel successfully for cabinets.

Enamelstrip Corp., subsidiary of National Steel Corp., Allentown, Pa.

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Worm, spur and combination gear models—single or double reduction—are supplied in 75 different types and sizes with any desired shaft arrangement.

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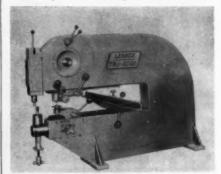
### ABART GEAR and MACHINE CO.

4829 WEST 16th STREET - CHICAGO 30, ILLINOIS
Use postpaid card. Circle No. 363

#### Portable, Easily Operated Shearing & Forming Machine

The Lennox portable bench model TE-100 MetlMaster is the newest in the Lennox Tru-Edge line of shearing, forming and piercing machines. It has an edge-cutting capacity up to 12 ga. in mild steel plate and 16 ga. in stainless steel, and is equipped with a ½ hp, 110 volt, single phase motor. Circle cutting capacity is 3" to 30" dia., throat depth, 32½". Model has a variable stroke length which can be adjusted from .022 infinitely through .110 without stopping the motor.

The operator merely sets the stroke



Cuts 12 ga. in mild steel plate, 16 ga. in stainless steel.

pointer at gage indicated on scale, and the unit is ready for use. Strokes per minute, cutting from 1750 through 3500, are automatically regulated according to material thicknesses when the operator sets the stroke pointer. It cuts from 8 ft. to 15 ft. of material per minute.

With the tooling available, this model cuts in center of plate without starting hole, cuts inside, slots, joggles, beads, etc., the company states.

All the production and safety features of the three larger floor models, TE-165, TE-218 and TE-281, are built into this bench model.

Lennox Tool and Machine Builders, Lima, Ohio.

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### Air Cylinder Actuates Chucks At Speeds Up to 3600 RPM

The Model RM rotating air cylinder is designed for use at speeds up to 3600 rpm. Constructed of aluminum alloy, it is light in weight, with lessened flywheel effect to re-

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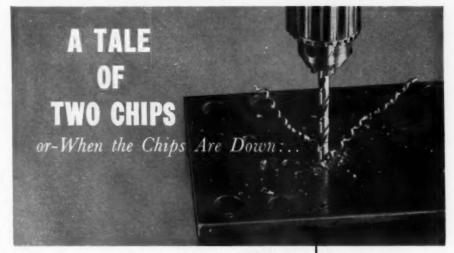


duce the load on the machine's motor, clutch and brake. It features also a double bearing inlet which gives longer life at higher speeds and faster operating response, the manufacturer claims.

Available in 3" to 16" bore sizes, these cylinders actuate chucks, collets, and other rotating holding devices. Strokes other than standard are also available.

The S-P Manufacturing Corp., Solon, Ohio.

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Do you get more holes per minute • longer drill life • closer tolerance holes • less operator fatigue?

Equal size chips mean you are getting these results from your drills.

Hand sharpened drills should produce equal size chips... but only after time-consuming work by an expert. Now, with the Black Diamond Drill Grinder\*, anyone in your plant can do the job with repeat accuracy in just a few seconds. Get the facts by return mail. Write exclusive distributor:

EDWARD BLAKE COMPANY, INC.
DEPARTMENT 5, 570 PLEASANT STREET,
WATERTOWN, MASSACHUSETTS WA 6-0100

\*Black Diamond Saw & Machine Works, Inc.
Natick, Mass. – Manufacturers of Black Diamond and Worcester Drill Grinders.



BLACK DIAMOND DRILL GRINDERS: For #70 drills up to ¾ (Illus.)

WORCESTER DRILL GRINDERS: For 1/4" drills up to 21/2"

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New Design

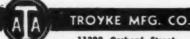
Greater Precision

Greater Rigidity Model R-21

6 Sixes . 8 Models

Guaranteed 60 seconds or less total accumulative angular error, (60 seconds equals .00087" at 6" diameter.)

Write for FREE Catalog Number 23.



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Cincinnati 41 (Sharonville), Ohio
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At last, a top quality industrial sander that provides all the most wanted features - yet sells for so little. \$9.95 complete-with card, plug, switch ready to use

> Illustrated Literature on Request A few desirable distributor territories still available.

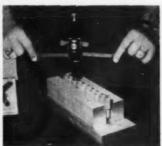
WALLS SALES CORPORATION
333 Nassau Avenue Brooklyn 22, N. Y.

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#### "Suspended Motion" Handle For Fast Gaging

The five oz. Foster handle uses a suspended motion concept said to provide faster gaging of tapped holes with reduced gage wear. American gage design standard, taperlock or reversible plug members up to 3/4" pitch diameter capacity can be adapted to this handle.

In suspended motion gaging, the gage member is engaged a partial turn in the tapped hole in the conventional manner, then further operation is accomplished by reciprocal motion. The pulling of two tabs outward from the gage handle imparts rotary motion to the gage.



Operator stays in one position when

Regardless of plane, angle, or position of tapped holes, the operator can remain in relatively the same position when gaging.

C. E. Foster Gage Corp., Indianapolis, Ind.

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### SUPERIOR® INDICATOR

A Low-Priced Dial Type Indicator
Has 2 contacts 1/32" threaded
within ½". Double Faced. Reeds
tront and back. Two Crystals.
Double faced dial indicator complete with plated holder including 1/32" and ½" contacts—
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MACHINE and TOOL BLUE BOOK

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## master model GH long bed lathes

Precision plus . . . Power to spare. The enormous power and accuracy built into the new Carroll-Jamieson Master Model Geared Head Long Bed Engine Lathe allows it to do precision work—at today's high production speeds. Makes it the ideal lathe for use in textile mills, paper mills, machine shops and in many other operations where high speed accuracy is needed.

Embodies features found only in higher priced lathes. 12 geared spindle speeds provide tremendous pulling power of from 20-900 rpms. Timken heavy duty taper roller bearings on the spindle. Quick change gear box. Rugged 5 hp motor. Wide range of threads and speeds—48 separate threads 3-184. Available in 16" or 18"



THE

MACHINE TOOL CO.

Dept. 1 Batavia, Ohio



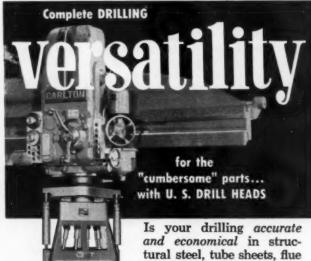
Indexing accuracy—1 min. ir 360°.

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10" Universal Dividing Head

A new 10" Model E universal dividing head has been added as a companion to Nichols-Morris Corp.'s line of 6½" Model A and 8" Model C precision dividing heads. A trunnion-type dividing head, it is designed for heavy duty applications. Among its features reported are: Indexing accuracy (one minute in 360°), auxiliary swivel base (optional), and compound indexing as well as direct and crank indexing. Accessories include draw-in collet attachment for No. 5C collets to 1/16" cap., chucks, face plates.

Nichols-Morris Corp., White Plains, N.Y.



Lots of cost-reducing features: Full ball bearing mounting ... Shave gears... Exclusive quick-change neoprene-sealed universal joints... Heavy duty spindles ... Adjustable-arm or special bored Slip Spindle Plates.

Is your drilling accurate and economical in structural steel, tube sheets, flue sheets, and other large cumbersome parts? Universal Joint Adjustable U. S. Drill Heads with Air Counterbalance and 360° Ball Bearing Swivel Attachment add versatility to radial drills.

Select the *right* head for your jobs from the many sizes of Style U Heads.



Adjustable and Fixed Center Multiple Drilling Heads.
Individual Lead Screw Multiple Tapping Heads.

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#### Pressurized Mist Coolant System

This system delivers coolant mixture under pressure to banks of machinery or a large number of stations. As many as 30 nozzles, to a height of 15' or parallel distance of 100', are said to be serviced from a single dispenser. The control valve assembly shown is mounted singly or in gangs and connected with ¼" O.D. tubing to one central five-gallon pressurized dispenser. Additional valves can be added. Air and liquid lines are individually adjusted for dispensing flow as desired.

Trico Fuse Mfg. Co., Milwaukee, Wis.



Air & liquid lines are individually adjusted for dispensing flow as desired.



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### JEMCO ELECTRIC HAND SHEARS and NIBBLERS

In use by major industries for over 25 years

10% Greater Efficiency-10% Lower Cost



Nibblers supplied with either standard or with right angle heads to cut corrugated metal.

Nibbler capacities-

18 gauge; 14 gauge and 11 gauge Shear capacities-

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in steel, other metals and plastics

Use the LOW COST pre-cision-built Preis Panta 3D-5 Engraving Machine. Does both 2 and 3 dimenengraving effortlessly.



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Write for complete details and prices, For immediate attention write directly to manufacturer below. Ask for meanest representative.

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#### **Cutters Adjust For Size** While Locked in Bar

A new line of reaming cutters, called Micro-Flote, claims to be readily adjusted for size while locked in the bar. Featured are extra-hard, extrastrong adjusting screws with National



Full floating compensates for alignment errors.

fine threads, plus an unusually smooth sliding action on ground surfaces, according to the manufacturer. Adjustment to .0002 can be made without loosening the locking screw on the bar. It is also reported that the reamers offer full floating action to compensate for errors in alignment, as well as generous chip clearance.

The reamers will be available in a full range of sizes.

Muskegon Tool Industries, Inc., Muskegon, Mich.

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### JIG GRINDING and JIG BORING

to your specification

At your disposal: Our sub-contract jig boring department, one of the best equipped in the

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# NEW TRI-MATIC Oscillating Belt Grinder

deburrs, descales, grinds, polishes . . .

Change Abrasive Belts in LESS THAN 2 MINUTES

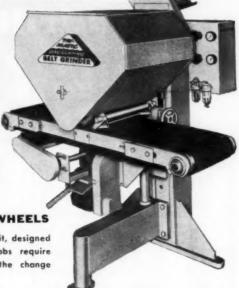
BELT TRACKING adjustments are completely eliminated by the Aer-Tronically Controlled belt oscillation. There are no projecting belt guides to interfere with changing or to fray belt edges. Just slide one belt off and another on. It takes less than 2 minutes from turning off the mochine to re-starting.

#### 4 MACHINE SIZES IN 1

A simple adjustment of the air jet sensing unit permits use of 6", 8", 10" or 12" wide belts.



The contact wheel and mount are one unit, designed for easy changing. Where different jobs require different contact wheel characteristics the change can be made in a matter of minutes.



### OSCILLATING BELT SPEEDS GRINDING, PROLONGS BELT LIFE

By imparting a shearing action, instead of a straight line push, the abrasive belt cuts faster cleans itself, reduces grinding patterns to a minimum and makes belts last longer. Variable speed conveyor adds to versatility.

Write TODAY for illustrative, descriptive Bulletin TM-459

TRI-MATIC DIVISION

Send your deburring, descaling, grinding, polishing problems to our abrasive engineers for their suggestions. No obligation.

Sales Service Mfg. Co.

2361 UNIVERSITY AVENUE, ST. PAUL 14B, MINNESOTA

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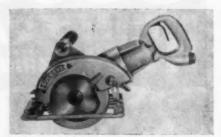
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#### 5/8" Arbor Pneumatic Saw

Buckeye Tools Corp. has announced the addition of a 5%" arbor pneumatic saw to their line of portable airpowered tools.

Two models are available: No. 74Z-147A (shown) for operation at 4800 rpm to cut wood, plastic, and such non-ferrous metals as aluminum, brass, and copper; and No. 74Z-145A for operation at 6000 rpm with abrasive cut-off type wheels to cut masonry



Model No. 74Z-147A operates at 4800 rpm to cut wood, plastic, non-ferrous metals.



### TAP with the quadtapper



into drilling position by indexing the turret. A real time and cost saver!

TAPPER to any of the four spindle assemblies of the QUADRILL, you can drill and top almost simultaneously. Affords accurate tapping at high speeds. DESIGNED FOR PRODUCTION COST CUTTING

ANY DRILL PRESS

By attaching the QUAD-

Send for complete details of both QUADRILL and QUAD-TAPPER construction and operation features.

#### CHICAGO QUADRILL

Company

1846 BUSSE HIGHWAY . DES PLAINES, ILL.

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and certain ferrous materials. Both models (without blades) are priced at \$425 each.

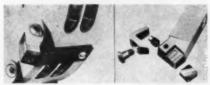
Maximum depth of cut on both models is 11/2", weight is 161/2 lbs., blade diameter is 61/2", and angle of cut is controlled by a tilt table from 0° to 45°.

The saw is powered by a Buckeye X-4 governed and spiral bevel-geared air motor to produce the torque required for a fast, stall-free cut without danger of shocks or motor burnouts, 90-100 psi working air pressure and 1/2" I.D. hose are recommended for maximum efficiency.

Buckeye Tools Corp., Dayton, Ohio. Use postpaid card. Circle No. 120

#### Milling Cutter Blade Holder Makes Insert Change Quicker

A new type of Sandvik Coromant milling cutter blade holder for dis-



Downtime cut because of easily-reached clamp locking screw.

posable inserts, designated T-Max 270. 1-1822, claims to cut down-time by providing unprecedented accessibility of the clamp locking screw. The new design puts the screw in an easy-tosee-and-reach position on the outside periphery of the milling cutter, which

### GRAYMILLS **Mist Coolant Systems**



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Precise air and fluid controls, corrosion proof. Translucent containers let you see the liquid level. Write for new folder.

3721 N. Linco CHICAGO 13. ILLINOIS

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November, 1959





### LINLEY RIVETERS



spin rivets noiselessly at low cost

Speed your riveling production with Linley Noiseless Riveters. We'll give you, without obligation, cost and time estimates of doing it the Linley way if you'll send us samples of parts to be riveted. Linley Riveters will do rivets up to 3½" in diameter in iron and cold rolled steel; larger sizes in brass, aluminum, etc.

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Also Builders of JIG BORERS 673 State St. Ext., Bridgeport 1, Conn.

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### **SAVE 80%**

Wardwell's SAVE-A-SAW (Combination Model EC) pays for itself by sharpening only two gross of saws for you. Automatic—sharpens teeth as fine as 32 per inch.



Sharpens Hack, Band and Circular Saws. Write for bulletin.

WARDWELL
3807 Ridge Rd. Cleveland 9, Ohio

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enables the operator to index or change the inserts of cutters equipped with these T-Max holders in a fraction of the time required for less accessible types of blades. A single twist of the wrench loosens the insert; another twist relocks it.

At present the new Coromant blade design is available in a negative rake style giving the following edge angles—radial rake, -7°; axial rake, -5° peripheral clearance, 7°; face clearance (at nose radius), 7°. Ideal to use with Coromant combination milling cutters.

Sandvik Steel, Inc., Fair Lawn, N.J.

#### Diamond Tool Lathe Produces Finishes From 3-5 Microinches



Six spindle speeds-705 rpm to 2920 rpm.

A precision diamond tool lathe has been designed to produce turned surfaces of super finish and accuracy from three to five micro-inches, and to provide correctness of cylinder form and accurate surface flatness. The ma-



**NEW! Self-Centering 5C Collet Stop** 

Quick friction adjustment Stays in fixed position, Will not distort collet, Will not move back. Also available for other collets and spindles. 30 Days Free Trial, Several Territories Openfor Distributors.

Write for Bulletin.

### BYCO INDUSTRIES

2201 Snelling Ave. Minneapolis 4, Minn.

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MACHINE and TOOL BLUE BOOK

chine is used particularly for nonferrous metal machine components for assembly with mating parts, eliminating the necessity of extra operations, such as lapping and honing, it is claimed. The lathe uses diamond, ceramic or carbide tools.

The company reports many features which include drip-feed lubrication, four-way tool holder with indexing mechanism, and a special air chuck mechanism, to name a few.

Specifications include a capacity of 8"; distance between centers, 17½"; three automatic forward feeds—.001" to .005" per revolution; six standard spindle speeds—705 rpm to 2920 rpm; one special slow speed for finishing work-holding fixtures in position; 1½ hp three-speed driving motor, and ¼ hp cruising motor for the slide.

Milo Manufacturing Co., Elizabeth, New Jersey.

Use postpaid card. Circle No. 122



Use postpaid card. Circle No. 381

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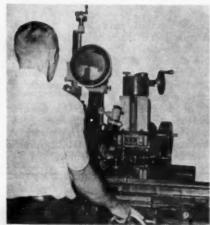
OK

#### Portable Optical Projector For Variety of Machine Tools

A new portable optical projector, which may be attached to a variety of machine tools, allows continuous precise magnified checking, direct measurement and comparison of work contours to transparent overlay charts. The projector features a complement of accessories including standard interchangeable magnifications of 10X, 20X, 31.25X, protractor screen, illuminators and mounting compounds for direct linear measurement to .001" or .0001".

Since the projector is portable it is easily converted from one application to another, or may be permanently mounted on existing grinders, lathes, milling machines, or other machine tools.

The projector has found its most conventional applications with circular and flat form tool grinding, production grinding of precision contours, regrinding of tools and dressing of critical wheel and tool shapes. However, coil-



Compares work contours to transparent overlay charts.

winding, metallizing and many miniaturization problems are reported also solved by its use.

Stocker & Yale, Marblehead, Mass.





### HERE'S PROOF OF PERFORMANCE

"We like everything about our Clausing lathe. The spindle capacity 'beef' of the machine and ease of operation are impressive. The finish we get is phenomenal. And, you just can't beat Clausing-Colchester geared-head lathes for outstanding value!"

THE JARO MACHINE & TOOL COMPANY

Clausing geared-head lathes do lead their field in capacity, performance and value. Here's why:

They're bigger in capacity than other lathes in their class. Larger spindles, larger thru-hole capacity, larger bearings for heavier work. 17" lathe spindle, for example, has 3½" thru-hole—15" lathe, 2½" hole—13", 1½" hole.

Have heavy-duty construction throughout. Bed ways are induction hardened. Gears in head and quick-change box run in bath of oil. Power feeds are taken from separate feed rod, lead screw is used for thread cutting only. Spindles are high-tensile steel.

**Built for precision performance** — to Amer-

ican standards of toolroom lathe accuracy. Have Gamet Micron tapered roller bearings with oil flow lubrication — the most advanced and accurate bearings known to industry.

Each is an outstanding value. 13" cabinet base models, including motor and controls, start at \$2302; 15" cabinet base at \$3221; 17" at \$5070. You owe it to yourself to investigate before investing in any lathe.

Lathe Capacities: 17' lathe: 54' and 75' centers, 28' swing in gap; 15' lathe: 30' and 48' centers, 24' swing in gap; 13' lathe: 24' and 36' centers, 18' swing in gap.

Write for Free Literature



### CLAUSING DIVISION

ATLAS PRESS COMPANY

11-107 N. PITCHER ST. . KALAMAZOO, MICH.

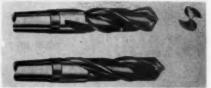
Use postpaid card. Circle No. 383

#### Newly Designed Twist Drill Eliminates Stringy Chip Hazard

This newly designed Lo-Tork twist drill is said to offer the advantage of breaking chips to manageable size and easily disposing of them. Drill flutes do not clog which affords an increased flow of coolant to the drill point. The manufacturer also states that the drill is safe, eliminating stringy chip hazards.

Drills are available in sizes of 3/4" and larger. 110-LT for regular taper

shank series or 120-LT for straight



As drill flutes do not clog, an increased flow of coolant to the drill point results.

shank series should be specified. Chicago-Latrobe, Chicago, Ill. Use postpaid card. Circle No. 124

# **FOSTORIA**LOCALITES



FOSTORIA CORPORATION . FOSTORIA, OHIO

Use postpaid card. Circle No. 384

#### **Finger Touch Releases** Lock on Lubricator

A new model of Wilkerson Auto-Fill Micro-Mist lubricator with quick-change bowl is now being offered to compressed air users. It is designed so that a touch of the finger releases



the lock. Simultaneously and automatically a valve bleeds the air from the bowl for safety reasons. Bowl is removed without need of tools or screw parts.

This lubricator eliminates the labor of hand filling, and the possibility of tools operating off an empty lubricator, the company reports.

Wilkerson Corp., Englewood, Colo. Use postpaid card. Circle No. 125

### **SAVE 50%**

or more in

### CONTOUR GRINDING



Visual Grind is manufactured by

### The CLEVELAND GRINDING MACHINE Co.

30510 LAKELAND BLVD.

WILLOWICK, OHIO

Use postpaid eard. Circle No. 385

# TAP GAUGE PERFECT PARTS Everytime!

### **New Lead Screw Tapper**

with Finger Tip Push Button Controls permits you to tap any quantity of practically any material, with absolute precision, without rejects, without stripped threads or distortion. Tests have shown it produces parts that pass 100% inspection—100% acceptable! The secret is in the tap control mechanism which feeds the tap automatically without any pressure. The Lead Screw controls the tap and guides it steadily through each cycle, guaranteeing supreme accuracy.

In addition, it offers convenient 5-way operation; pushbutton and foot control for complete cycle or jog automatic (without foot or hand controls) or with switch fixture for full cycle. Either way, you get

uniformity, speed and precision that's unpaalleledt

FREE BROCHURES

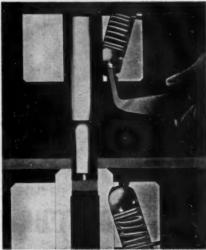
on the new lead screw push button Procunier Topping Head line are yours FREE. Write today!



PROCUNIER SAFETY CHUCK CO.

14 S. Clinton St., Dept. 11, Chicago 6, III. Use postpaid card. Circle No. 386

**Punch Eliminates** Slug-Pulling In Die



Cross-section of typical die set-up showing mounting of the punch. Spring ejector has pushed slug away from end of punch immediately after piercina stroke.

Slug-pulling is often a major problem in metal fabricating and when piercing thin materials the problem is increased. Thus, in running high production dies, damage often occurs. The new R-B slug shedder punch, as an answer to the problem, is said to effectively eliminate slug-pulling in any die regardless of the material or its thickness.

These punches are available with round punch points in diameters from 1/16" to 5/8" and punch lengths from 2" to 3": specials to customers, specifications.

Richard Brothers Punch Div., Allied Products Corp., Detroit, Mich. Use postpaid eard, Circle No. 128

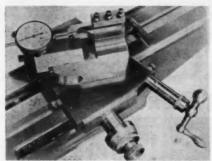
Radius Turning Attachment Has Capacity to 35/8" Dia.

The Wade radius turning attachment is reported to machine concave or convex surfaces on the axis of the lathe by generating this surface with a single point turning tool. The tool

MACHINE and TOOL BLUE BOOK

bit is set directly to the desired radius by taking the reading on a dial indicator which reads in thousandths.

Capacity is from 0 to 35%", either concave or convex. The beveled edge reads directly in degrees. Although



Concave or convex surface is generated with a single point turning tool.

this radius turning attachment has been designed primarily for the Wade No. 94 or 10-B, it can be adapted to other lathes.

The Wade Tool Co., Waltham, Mass.
Use postpaid card. Circle No. 127

Fiberglass Curtain Protects Boring Bar

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OK

A & A Mfg. Co. Inc. has now expanded operations to include curtains and covers for numerous industrial applications. As illustrated here, a fiberglass curtain is catching the blue-hot chips from a boring bar at Allis-Chalmers in Milwaukee. The 14' wide, 30' high curtain is raised and lowered



Was postpold eard. Circle No. 387 lovember, 1959

### It's SENSATIONAL!



**CUTTING FLUID** 

## STAINLESS CUTTING PROBLEMS

Amazing but true! A drop or two of this fluid instantly releases stuck tools . . . lets you tap, ream, drill and thread hard-to-sut stainless steels with ease and speed!

RELTON

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99 N. LOTUS AVE., PASADENA, CALIFORNIA

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### Production CHUCK

#### Will pay for itself in 60 to 90 days

On turrets, engine lathes, cuttingoff machines, drill presses or any type of chucking machine, the Barker Two-Jaw or Three-Jaw hand operated chuck will increase production up to one third and actually pay for itself while

doing it in from 60 to 90 days.
Hand lever eliminates pneumatic and hydraulic systems, yet closes and locks jaws with lathe running or stopped. Over 30 years of labor saving, production boosting operation.



Hand lever closer and locks while



Jaws locker

Write for bulletin 201 today.

CHUCK DIVISION

THOMAS HOIST CO.

24 5. HOYNE . CHICAGO 12, ILL.

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Workmen are protected from hot chips.

by air-motor synchronized with the travel of the head on the Ingersoll boring bar. This widespreading protection not only guards tool-ways, spindles, rams, cross-rails, etc., but also prevents hot chips from striking the workmen.

Materials from which curtains and covers are fabricated include fiberglass, Teflon, neoprene and silicones.

A & A Mfg. Co. Inc., Milwaukee, Wis,

### **NEW! Profilometer GROUP III**



### Measures Roughness of Surfaces from 1/8" to Flat — ID and OD

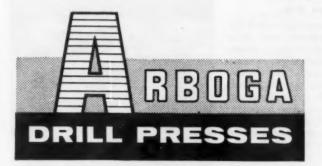
NEW Type LK Tracer measures on ID's and OD's as small as 1/8"; flats; tapers; narrow splines; gear teeth.

NEW Type QC Amplimeter shows roughness from 0 to 1000 microinches (arithmetical or r.m.s.) on easy-to-read meter. Has 3 standard roughness width cutoffs. Lightweight and portable; built for shop use; factory-calibrated for dependability.

WRITE for descriptive literature.



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40" RADIAL DRILL

11/2" Capacity in steel

Speeds, 80-890 r.p.m.

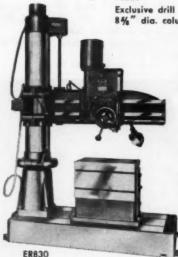
Feeds

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S.

Exclusive drill ejector 8 1/4" dia. column



Any of our 100 dealers across the country will be proud to show you these and the other quality drill presses in the Arbogg line. There are over 98000 now in use-many completing as much as 25 years of dependable service.

Call any of the numbers below, or contact our home office for more information.

8 SPEED DRILL

PRESS

24" Swing 11/2" Capacity in steel 80-890 r.p.m.

Exclusive drill ejector



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OOK

E-830

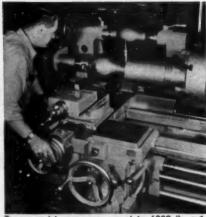
#### Tracer Produces Contours Down to 0.001" on Dia.

A 90° hydraulic tracer, designed for use on LeBlond Machine Tool Co.'s heavy duty and standard duty lathes, will trace from either flat or full round templates. It is suited for tracerturning stepped shafts, spindles, gear blanks, forming rolls, arbors, axles, cones, sheaves, pistons, and balls.

A master workpiece can be used for a template, or a flat template can be cut from inexpensive flat stock. The template is mounted between centers behind the workpiece, and the tracing stylus contacts it from below. Switching from tracer to standard operation or back again takes only 30 seconds.

The tracer will resist pressures equal to 6,000 lb. of cutting force at the tool tip, yet is said to be so accurate it will produce template contours down to 0.001" on diameter and shoulder length.

Sizes and capacities are offered for

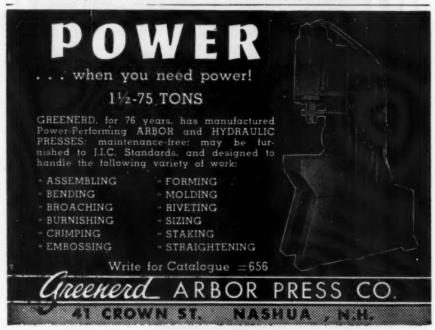


Tracer resists pressures equal to 6000 lb. cutting force at tool tip.

16", 20", 25", 32" and 40" standard duty and 13", 16", 20", 25", and 32" heavy duty LeBlond lathes.

R. K. LeBlond Machine Tool Co., Cincinnati, Ohio.

Use postpaid card. Circle No. 129



#### Low Carbon Flat Stock

Starrett No. 498 low-carbon precision ground flat stock of exceptionally high machinability offers the economy of a low carbon steel plus lower machining costs, better finish and longer cutting tool life, the manufacturer claims.

An .18 carbon, fine-grained, siliconkilled steel of forging quality, the stock has ends machined square, edges ground parallel and square, with thickness accurate within .001". Because it is precision ground to accurate size, a wide variety of work having two flat, parallel sides can be produced by simply laying out and cutting to the required shape.

24" lengths are offered in widths from 3/6" to 16" and in thicknesses from 1/16" to 2-7/8". Each piece is identified, and individually packaged

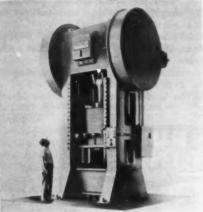
in a protective envelope.

The L. S. Starrett Co., Athol, Mass.
Use postpaid eard. Circle No. 130



46 VICTOR AVE., DIV. 22 DETROIT 3, MICHIGAN

### Toggle-Eccentric Feature Makes Efficient Speed-Draw Press



200 ton single-point, single-action speed-draw press with die cushion.

A new line of presses, known as Steelweld speed-draw presses, is particularly suited for deep-draw applications. The manufacturer claims this press permits making extra long draws at higher speeds than shallow draws on a standard crank-type press.

Because of the toggle-eccentric mechanism, the slide of the new press accelerates rapidly to a given speed which is then maintained throughout the down stroke. Deep draws can then be produced with fewer rejects.

These presses are available with one-, two- or four-point suspension and for single and double action. They will accommodate die cushions to provide blank-holding pressure for draw work.

Capacities of 200 tons (based on ¾" from bottom of stroke) and up are offered. Standard bolster areas start with 30" x 36" and standard slide areas start with 30" x 30" and range upwards.

The Steelweld Machinery Div., The Cleveland Crane & Engineering Co., Wickliffe, Ohio.

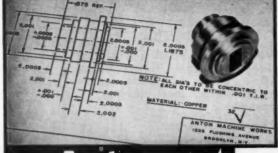
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The accuracy which is

immediately apparent in the precision part shown, is typical of HUNDREDS of THOUSANDS of parts produced year after year in our plant.

A fully responsible source with unusual facilities for turning, milling of small intricate





parts, and enviable performance record in this highly specialized field.

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Machine Works

Machine Works 1226 Flushing Ave., Bklyn. 37, N. Y SEND DRAWINGS OF YOUR DESIGN FOR QUOTATION

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### DCOR HIGH PRODUCTION ROLL

### FORMING MACHINE FOR ALUMINUM SHAPES



The new small Model SF ARDCOR Machine features: High production speeds; spindles 1.5"; new style rugged base with tool compartment and slanted front recessed for better operator stance; special narrow side roll stands with close 10" horizontal centers; fixed spur gears; quiet running all V-belt drive; low voltage protection. Basic machine readily converted to a Cold Roll Forming Machine.

ARDCOR Roll Forming Machines and Lock Seam Tube Mills are available in seven standard sizes, other sizes to customer specifications.

If your products can be cold roll formed, ARDCOR engineers can supply advancements in design and machine construction to produce them better . . . at greater speeds and profit.

Consult our Engineering Facilities, without obligation . . .



### American ROLLER DIE CORP. 29560 Clayton Avenue Wickliffe, Ohio

DESIGNERS, ENGINEERS AND BUILDERS: Single Roll Forming Machines or Completely Automated Production Lines for Cold Forming, Ferrous and Non-Ferrous Electric Weld and Lock Seam Tube Mills • Forming Rolls, Tubing and Pipe Rolls • Straightening, Pinch and Leveller Rolls • Cut-Off Machines • Slitters

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DK

### **New Line of Portable Pneumatic Grinders**



Part of the 902 series of horizontal grinders.

Use postpaid card. Circle No. 132

The 902 series in its new line of portable pneumatic grinders will consist of 4" heavy duty horizontal grinders, wire brushing machines, and horizontal buffers, Thomas C. Wilson, Inc., has announced. Grinders and wire brushing machines in the series offer a choice of three speeds—12 thousand, 9 thousand, or 7.2 thousand rpm. The horizontal buffers, having a 1" longer spindle than the above mentioned, are available in two speeds—12 thousand or 9 thousand.

Thomas C. Wilson, Inc., Long Island City.



### Drills Holes in Solid Steel From Any Angle

The Trocki ball bearing 100% point cutting adjustable drill is claimed to be the first of its kind to be able to drill and bore holes of different diameters in solid steel or material from any angle without bushings or pilot on any rough surface. It will perform in regular drill presses, radials, lathes, screw machines, turret lathes, etc. Made in four sizes, from 7/8" to 2-9/32", the tool drills holes with up to 1/3 pressure. Price per complete set in a wooden case, \$164.00.

Erie Precision Products Co., Erie, Pa.



Four sizes—7/8" to 2-9/32". Use pectpaid eard. Circle No. 188



### B & W PRECISION PRODUCTS CO.

11393 E. Eight Mile Road, P. O. Box 3865 Detroit 5, Michigan, Engineering Dep't. B

Use postpaid eard, Circle No. 397

### PRICE + SERVICE = COST

As with any item, both factors must be considered in purchasing

### **Punches & Dies**

SO the LEWTHWAITE CATALOG SHEETS list our large, planned stocks of interchangeable and exceptionally long wearing punches and dies—with prices—

AND include charts and instructions for figuring correct clearance allowances for both type and thickness of metal being punched—so that the best tools are used under the best conditions—

THEN leave it up to you to buy-try-and lecide

WHEN you do, we think you will join the ever-growing list of T. H. LEWTHWAITE customers.

Send for catalog sheets on our complete line today.

### T. H. LEWTHWAITE MACHINE CO.

312 East 47th St.

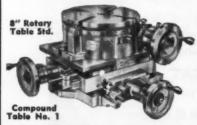
New York 17, N.Y.

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### The STEVENS Line

**SINCE 1925** 

Introducing NEW Series



ROTARY TABLES, 5-8-12-15-18-24" sizes both standard & dial indexing types. ADJUSTABLE TILTING TABLES, #1-2 COMPOUND TABLES, #1-1½-#2 ROTARY-COMPOUND TABLES #1-1½-2 INDEX CENTERS-multiple spindle

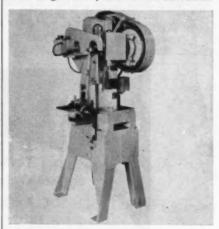
See your dealer or write for bulletins
The JOHN B. STEVENS Company

SOMERSVILLE. CONN.

Use postpaid card. Circle No. 462

High Speed Bench Press Has Five Ton Capacity

Built to operate at 450 to 900 strokes per minute, this new type high speed V & O bench press has a capacity of five tons, a dovetail slide or round shank hole and a counterweighted shaft. It has a 3/8" eccentric stroke, a shut height of 8", and has an automatic



Fabricates small precision parts.

lubricating system. The press was developed for the fabricating of small precision parts.

Driven by a 1½ hp ball bearing motor, the press is equipped with an electrically controlled V & O air clutch.

Emhart Manufacturing Co., Hudson Div., Hudson, N.Y.

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### CAMS

To Your Specifications except Screw Machine Cams

Design Assistance Offered

KIDDE PRECISION TOOL CORP. 25 LOCUST AVE. ROSELAND, NJ.

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MACHINE and TOOL BLUE BOOK

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A Unique, Rubber-and-Abrasive Action.

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bridging the gap between the grind and buff, frequently in one operation

Wheels . Sticks . Rods . Blocks

JOB-MATCHED to your machine and manual operations. Exceptionally suited to automation production.

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Silicon Carbide and Aluminum Oxide Grains—grades extra fine to extra coarse—in soft, firm and tough rubber binders.

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BRIGHTBOY INDUSTRIAL DIVISION WELDON ROBERTS RUBBER CO.

95 North 13th Street

Newark 7, N.J.

America's Pioneer Manufacturer of Rubber-Bonded Abrasives

Use postpaid card. Circle No. 473

#### High Speed Fabricator Has 30" Throat Depth

The Super 30 Fabricator is a single station, high speed punch press with a throat depth capacity of 30". For straight line punching, it will handle a 30" workpiece of any length, using the Strippit multiple-stop gauging system. For production punching with the Strippit Duplicator, its maximum work size is 25" x 30". Hole punching capacity ranges from a 3½" hole in

16 gauge mild steel to a ½" hole in ¼" mild steel with a tolerance of ±.005. It will handle 90° corner notching up to 5" x 5" in 16 gauge mild steel as well as rectangular, radii, vee and special shaped edge notches. The new machine will do straight line nibbling and contour shearing at 165-strokes per minute with a capacity of ¾" mild steel. A single switch permits instant changeover from single stroke punching to nibbling. This





Model J (Heavy-Duty) (Wet or Dry Models)

Johnson Model "J"... the heavy duty band saw that speaks for itself. No other saw handles so many operations so easily and so economically. Why pay more when a Johnson Model "J" can cut the 10" rounds, 18" flats and odd shaped steels of your shop in such labor saving time. The Big "J" is completely automatic—and is available in a wet or dry model, both with variable speed and centralized control system. You can't afford to miss any information on the rugged Johnson Model "J". Contact your dealer today!



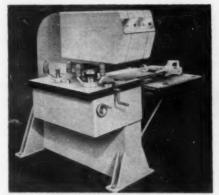
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Berkeley, Calif.

fabricator features the Strippit quickchange punch and die system which enables the operator to change from one size to another in less than 20 seconds.

The new electric head, which controls the operation of the ram, is said



On the adjustable table are the machine's two tool holders and corresponding dies. At the left, the holder for punching holes up to  $11_4^{\prime\prime}$ —on the right, the holder for punching holes larger than  $11_4^{\prime\prime}$ , up to and including  $31_2^{\prime\prime}$ .

to completely eliminate the need for pressurized air.

Featured also is an adjustable table which permits the use of pedestal dies to enable the operator to punch holes in angles, shapes and formed parts. An important accessory is the Strippit Duplicator which can be built-in as an integral part of the machine.

Wales-Strippit, Inc., Akron, N.Y.
Use postpaid eard. Cirele No. 133

### Ball Joint Actuated Chuck Offers Great Accuracy, Rigidity

New "Ball-Lok" power chuck introduces ball joint actuation, replacing the "T" slot design. Ball joint actuation affords pull back action against fixed work stops resulting in



stops resulting in great accuracy and

# SHE POUND HAT OR MASESTI No. 1 MAGE HARDENING COMMAN MATERIAL CAMPAGE, MAJORIAN, MAJORIAN,

### SPEEDY-SAFE NON-POISONOUS

CASE HARDENING

Indispensable for Tool Rooms, Machine Shops, Schools, etc. Now available in 1, 5, 10, 25, 50 and 100 lb. containers. Write for Free Catalog

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1 King St., Mahwah, N.J. Use postpoid cord. Circle No. 403



DANNEMAN DIE SET DIVISION Acme-Danneman Company, Inc. 203 Lafayette St., New York 12 • AL 5-7150 Use postpoid card. Chcle No. 404



### MUMMERT-DIXON FACING HEADS with Automatic Feed

One-way Tool Feed—8, 9 and 12" sizes.

Two-way Tool Feed—9, 12, 18
20, 24, 30, 36, 40 and 46" since.
Save many costly set-ups.
Bulletin No. 4141 Gives Full Details

MUMMERT-DIXON CO. 122 Philadelphia St., Hanover, Pa.

Use postpaid eard. Circle No. 405

K

rigidity in chucking parts.

Up to five to one linkage ratio generates great gripping power. The actuating mechanism is completely lubricated and sealed, eliminating wear due to chips and foreign matter. Jaw segments are reversible, interchangeable and can be serrated or furnished with inserts.

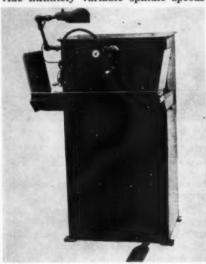
Power chucks are available for both external and internal application, in standard sizes, 10", 12", 15" and 18". Special sizes are available on request.

The new chuck is used primarily on multi-spindle turning or boring operations. However, other parts can be run within the part range of each size chuck.

N.A. Woodworth Co., Detroit, Mich.

### Honer Has Speeds 225-525 RPM Optional, 450-1050 RPM

Model J2 honing machine, designed for production runs, toolroom work and salvage operations, is said to provide infinitely variable spindle speeds



14-gallon coolant tank is removable for easy cleaning.

from 225-525 rpm, or an optional range of 450-1050 rpm. It is powered by a



Use postpaid card. Circle No. 406



### Multiform Bender CUTTER

CUTS, BENDS, PUNCHES

Available in hand, air and hydraulic models, the MULTIFORM is shipped complete with full assortment of dies and mandrels to punch, bend, and cut round or flat brass, bronze, aluminum, steel, etc., up to ½" x ½" as illustrated, other models up to ½" x 8"

J. A. RICHARDS CO. KALAMAZOO, MICH. ½ hp, 110-V, 60 cycle, single phase motor.

The complete drive, motor and coolant tank are enclosed in the heavy steel base, the cover of which is louvered to permit adequate ventilation. The 14-gallon coolant tank is removable for easy cleaning.

Optional equipment includes a dial indicator, full width extension tray, and filter tray with three settling baffles and burlap filter.
Superior Hone Corp., Elkhart, Ind.
Use sectuald eard, Circle No. 137

#### Torque-Sensitive Driver Prevents Drill Breakage

A new driver announced by Scully-Jones and Co., for use in manual-feed drilling and reaming operations, has an over-rolling-type, adjustable clutch to disengage the tool when breakage is eminent.

The driver, which adapts to stand-



Universal Right Angle Irons made to unusually high standards for squareness and parallelism. Heights from 5" to 16".



Toolmaker's Knee has all finished surfaces ground square and/or parallel to each other within .0001".



Standard and heavy duty precision V-Blocks with workholding capacities from 1 4" to 6%" diameter.



Universal Squares feature precision lapped knife edges, square to within .00015" or better.



Sine Bars are made with overall accuracy in tenths and finer. Scientifically heat treated and precision ground. In 3", 5", 10" and 20" sizes.

# PRECISION TOOLS FOR MASTER TOOLMAKERS

Taft-Peirce Production and Inspection Equipment gives the Master Toolmaker the one vital ingredient essential to his craftsmanship: "ACCURACY HE CAN TRUST."

You can buy and use Taft-Peirce tools with confidence, and rely on published manufacturing tolerances and job-tested design.

SEND FOR NEW PRODUCTION AND INSPECTION EQUIPMENT CATALOG NO. 511. AND SPECIFY TRUE PRECISION TOOLS BY TAFT-PEIRCE FOR YOUR TOOL ROOM.

TAFT-PEIRCE

7 Mechanic Ave. WOONSOCKET, RHODE ISLAND

Use postpaid card. Circle No. 408

ge

a

ard machine spindles and drill chucks, can be adjusted for a variety of jobs to release before torque reaches a tool's break strength. A clutch, which drives through rollers wedged between cams, releases instantly and completely at the preset limit. This clutch is said to sense any slight increase in torque, and so helps to prevent small drills, which walk easily in hard materials, from breaking.

Scully-Jones and Co., Chicago, Ill.

### MAGNETIC SINE PLATES



COMPOUND AND SINGLE ANGLE

> **New Dual Field** permanent magnetic chucks with extra holding power. Positive lock on each axis.

The new Dual Field permanent magnetic chucks, with a center T slot, allow either side to be magnetized independently. All models are accurate to .0002" in dimensions and parallelism, A .2000" recess is provided for small angles.

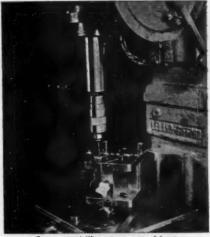
Write for catalogue and prices on full line of Bald Eagle Sine Bars and Plates.



For Quality-Specify Baid Eagle

356 Codor Street . St. Paul 1A, Minn.

Use postpaid card. Circle No. 409



Compact drill and reamer driver. Use postpaid eard, Circle No. 138

**Box Finger Brake** 

A new box finger brake, with 24" forming width, is useful where boxes, cabinets, chassis and panels with up to 1" lip or flange on top or bottom are to be formed. Material clearance of 1" between box fingers and bottom plate is possible by a lever operated cam raising the entire finger mount bar.

The unit, called Model 24, has box fingers to be used in combination to form any width of box or pan from 34" to 24" by 1/2" steps.

O'Neil-Irwin Mfg. Co., Lake City, Minn.

Use postpaid eard. Circle No. 139



MOISTURE ABSORBING RUST-PREVENTIVE LUBRICATING

for-TOOLS . DIES . JIGS MICROMETERS . GAGES . METAL PARTS . IDLE MACHINERY

Used by leading manufacturers and metal fabricators. Also available in bulk-5 to 55 gallon drums.

Write for free sample on company letter-head

RUST-LICK, INCORPORATED 755 Boylston, Boston, Mass.



Compact Air Screwdriver

The new line of Desoutter screwdrivers, manufactured by Desoutter Bros., Ltd., England, uses an air motor which is reported by Newage Industries to increase power 50% over their standard model, with maximum expansion in either direction. Price range from \$79 for non-reversing tool to reversing Super Atom at \$125. Speeds vary from 300 to 2,000 rpm. Featured is a system of porting and valve design. Tool uses standard ¼" shank bits and nutrunners. Adjustable silencing sleeve diverts exhaust out of way.

Newage Industries, Jenkintown, Pa.



Speeds from 300 to 2,000 rpm.
Use postpaid eard, Circle No. 140



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to m

KOK

Redesigned Straight Side Press Covers 25 to 1000 Ton Range

Redesigned and modernized, the KRW line of straight side, single action hydraulic presses has been expanded to cover a 25 through 1000-ton range. These machines can be used to perform operations such as trimming, bending, forming, blanking, briquetting, broaching, coining, embossing, forging and straightening.

The compact presses feature rugged,

## Allman Universal Hand Tapper 5 TIMES FASTER

A great time, labor and material saver. Fixture taps five heles to every one using the free hand method. Eliminate certiy tap breakage.

CHECK THESE FEATURES:

- Articulate arm swings clear of inrge table for placement of work.
- Limitiess number of sizes of tapped heles without meving work piece.
- Vise holds work as small as %" square.
- . Floating tap lo-
- Individual spindle helds taps, thus change requires enly seconds,



TOOLS,

1735 No. 25th Ave. • Melrose Park, III.

Use postpaid card. Circle No. 412



Rugged, rigid, welded steel construction.

rigid, welded steel construction. Compact KRW hydraulic systems can be mounted at the top of the press or furnished for floor installation. Safety is provided by a counterbalance valve which prevents the platen from dropping through loss of pressure in the system, or because of excessive die weight.

All 48 models are available with either up-acting or down-acting platens, constant speed or variable speed pumping systems, and manual lever or electric push button controls for single or continuous cycling.

K. R. Wilson, Inc., Arcade, N. Y.



Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per-hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

HEIMANN MFG., CO. . URBANA, OHIO

Use postpaid card. Circle No. 413

MACHINE and TOOL BLUE BOOK

IN 11 SIZES-

N.C. In all S.A.E. sizes.

Large Sizes Added to Open End-Box Wrench Line

Induced by the popularity of the open end-box type of wrench, J. H. Williams & Co., has recently extended the size range of this line with the addition of 1-11/16", 1-3/4", 1-13/16", 1-7/8" and 2" 12-point opening sizes. These wrenches are said to have exceptional strength for their thin, slim jaws and sleek handles. They are drop-forged from selected alloy steel, heat-treated and chrome-plated over nickel.

J. H. Williams & Co., Buffalo, N.Y.



Sizes added: 1-11/16", 1-3/4", 1-13/16", 1-7/8", and 2".

One of these Wilson "Rockwell instruments will do your

hardness testing job

No matter what your hardness testing requirements are, there's a Wilson "Rockwell" tester to do the job. Choose from this complete selection of hardness testing equipment:

"Rockwell" Hardness Tester—for most hardness testing functions.

"Rockwell" Superficial Tester—for extremely shallow indentations.

TwinTester—Combines functions of "Rockwell" and "Rockwell" Superficial testers.

5emi and Fully Automatic—for high-speed testing, at rates up to 1,000 pieces per hour. Automatically classifies pieces as CORRECT, TOO HARD, or TOO SOFT.

**Special Machines**—for testing large objects, internal readings, and other unusual applications.

Diamond "Brale" Penetrators—Flawless diamonds, individually calibrated, and highest quality construction assure perfect testing every time.



Write for Bulletin RT-58

## WILSON "ROCKWELL" HARDNESS TESTERS

Wilson Mechanical Instrument Division American Chain & Cable Company, Inc.

230-T Park Avenue, New York 17, New York

Use postpaid card. Circle No. 414

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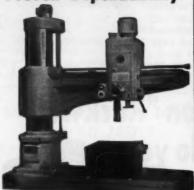
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OOK

## DRILL PRESSES

**Proven Dependability** 



WEBO Radial Drilling Machines from 2½" Arm with 9½" Columns to 8' Arm Machines with 19¾" Column.





World Famous Radial and Upright Drilling Machines. High speed sensitive type to heavy duty upright and redial models.

Hundreds In use throughout the United States. Outstanding in performance and low in first cost and maintenance.

WEBO Upright, sensitive and multiple spindle drilling machines. Up to 21/2" capacity.

Ask for Literature and Prices for your require-ments.

See our exhibit ASTE Show, Detroit Artillery Armery, April 21-28, Booth No. 555

Factory Distributors.

James W. George ACHINERY DETROIT 26, MICH.

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#### INCREASED PRECISION . . .



W. VON ARNAULD CO. Oakland, N.J. 95 Grove St.

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the latest completely illustrated

CATALOG No. 207

A complete line of vises and rotary tables for production, tooling and maintenance.

68 different models and types. Vise jaw sizes from 11/2" to 8".

Chicago Tool and Engineering Co.

8384 South Chicago Ave. Chicago 17, III.

Use postpaid card, Circle No. 416

#### Help Fight TB



Use Christmas Seals

#### Aircraft Drills Designed For Super Alloys

New from National are 3300 Series Aircraft Drills—heavy duty jobbers' length drills designed for drilling aircraft and missile super alloys and high strength steels. They work efficiently at high temperatures and are used either with stationary or portable drilling units. Drills are made from 8% cobalt high speed steel with a high vanadium content. Their short flutes give maximum rigidity.

National Twist Drill & Tool Co., Rochester, Mich.



Short flutes give max. rigidity; special point gives good penetration.

Use postpaid card. Circle No. 144



OK



Heats to 1500°C or 2750°F.

#### **Tube Furnace For Larger Tube Sizes**

New Model VL high temperature tube furnaces supplement the company's standard line of single and dual tube furnaces, offering longer, more uniform heated zones with larger tube sizes. It was designed specifically for the electronics industry, but is useful also in other industries. Unit heats quickly to the max, temperature of 1500° C or 2750° F, with close temperature control and uniformly heated work zone. Three sizes are offered.

The Sentry Co., Foxboro, Mass.

Use postpaid eard. Circle No. 145



Clearing Div. of U.S. Industries has recently added a 60 ton capacity machine to their present family of Torc-



The frame, drive and head are interchangeable.







Pac O.B.I. presses, which offered only 22, 32, and 45 ton sizes. The new press is composed of three basic units-the frame, the drive, and the head-which are completely interchangeable.

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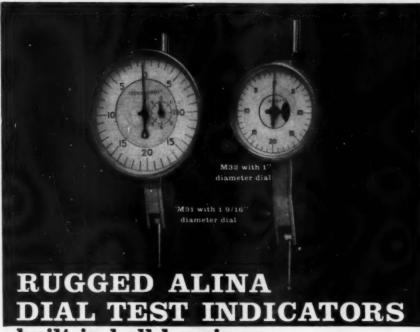
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The company writes that this feature has solved many problems of maintenance and obsolescence. For example, a replacement drive can serve as a standby unit for an entire shop full of presses. With regard to obsolescence, the drive and head units can be used in any special press application.

Like its smaller previous models, this press features an air-friction clutch in which bronze friction plates are used. These plates operate in a sealed-in-oil enclosure. Because of this provision, very little wear is reported to take place in the clutch and brake.

Clearing Div., U.S. Industries, Inc., Chicago, Ill.

Use postpaid eard, Circle No. 146



## built-in ball bearings

for greater sensitivity-reduced pressure-improved accuracy

- Jeweled Shock Proof Range .032" Graduated .0001"
- Reading 0-20-0
   Fully reversible contact point



Available with a wide variety of rectangular or round shanks. The instruments shown here are part of a complete line of precision DIAL TEST INDICATORS of all types - Write for brochure!

122 East Second St., Mineola, L.I., N.Y.

Use postpaid card. Circle No. 420

OOK

#### Ultra-Fine Hole Driller For Mill or Drill Press

Following on the success of the Hunter small hole driller released earlier this year, Hunter is now introducing an even more precise ultrafine hole driller which features the Albrecht micrometer chuck or the small Jacob's.

With this precision Hunter-Stanley small hole driller, the company claims an accuracy of .0002. It has finger tip



Driller at work in a lathe.

control which allows the operator to feel his way, thus saving breakage of many small drills.

Hunter Tool, Whittier, California.

#### Dial Indicator Is Watertight and Shockproof

When using dial indicators on machine tools, their exposure to oil, water, and abrasive or grit seriously affects their function and often renders them useless. This has prompted the Mahr Gage Co. to develop a watertight dial indicator which is said to be absolutely pro-





Use postpoid card. Circle No. 421

TRADE

AUTOM

MARK

Offset Type

CONTINUOUS HINGES

All hinges shown can be furnished with special holes, culous and bends to blue-print in metals to suit the job.

Plain Type

THREE-FOURTHS

& MFG. CO. 1110 E. 87TH ST. CHICAGO 19, ILL.

Use postpoid eard, Circle No. 422

SPECIFICATIONS
Open width 7/, " to 6"
Gage Material .040 to .125
Pin Diameter .101 to 3/,
Lengths to 120"

SEMI-OFFSET

tected against the entrance of moisture and dirt thus making the indicator suited to applications on grinders, lathes, boring mills, etc., where they are exposed to cutting fluids and abrasive dust. The manufacturer also claims it is shockproof.

Made completely of steel, the instrument's case is dull chrome finished for protection against corrosion and the measuring spindle as well as the shank are made of stainless steel. A very important feature is that the fine adjustment (zero setting) of the dial is made by turning the knurled knob at the upper end of the measuring spindle instead of turning the dial.

The measuring pressure can be set to 65 grams or 100 grams respectively. The dial diameter is 2¼" with dial graduated 0-40 and reading directly in .0005", total range .400".

Mahr Gage Co., Inc., New York, N.Y.

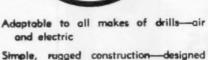


# CAPACITY ( AT LOW COST MAGNETIC BASE RADIAL DRILL PRESS

YET COMPLETELY PORTABLE!

#### SAVES ON

- MAN HOURS
- . SET UP TIME
- . MATERIAL HANDLING



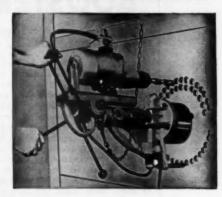
for many years of trouble-free service Versatile—its compact size makes it

suitable for many different applications

Reaming and tapping time and costs can be slashed with the new BUX

## OPERATES IN ANY POSITION WITH NEW RADIAL POSITIONER

does the job of a \$16,000 Radial Drill!



BUX magnetic products

BUCK MFG. CO.

1355 NORTH TENTH STREET

SAN JOSE, CALIFORNIA

Use postpaid card. Circle No. 423



Penetrates 1/8" dia. hole to 1/2" deep.

Use postpaid card. Circle No. 149

**Accessory to Cleveland Roughness Meter** 

Directly interchangeable with the present line of Cleveland surface roughness pickups, a new accessory to the Cleveland roughness meter extends the measurement range of internal diameters down to \(\frac{1}{8}\)". It will penetrate a \(\frac{1}{8}\)" dia, hole to a depth of \(\frac{1}{2}\)" and a \(\frac{1}{4}\)" hole to any desired depth. The pickup may also be used on flat surfaces and outside diameters as small as .030". The pickup measures to within .025" of a shoulder. Measures surface finish in areas of limited size.

The Cleveland Instrument Co., Cleveland.



#### Hydraulic Benders For Stock Up to ½" x 8"

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Two new models have been produced in the "Multiform" line of hydraulic bending machines—Model BB-H (illustrated) and the Model BB-C, a heavyduty machine of larger capacity.

The BB-H handles a wide range of bends on stock up to  $\frac{3}{8}$ " x 6", while the BB-C will bend  $\frac{1}{2}$ " x 8" copper. Both models are completely self-contained. The BB-H is equipped with

a 10 hp motor, while the BB-C carries 15 hp. Both models feature a constant-power hydraulic system. Foot-pedal controlled model BB-H is capable of speeds from inching through 21 strokes per minute, while the electronically operated BB-C operates on a complete cycle of only four seconds. Both models are recommended particularly for bus bar forming, metal fabricating, stamping, blanking, staking, piercing, etc.

Standard tooling is provided with

## FOR COST-CUTTING SPEED AND ACCURACY



Angle Plates



Slotted Angles



Box Parallels



Vee Blocks



Straight Edges



**Aluminum Angles** 



Alum. Height Blocks



Boring Mill Parallels



Adjustable Layout Angle Plates



Cylinder Squares



Scale Holders



Extension-Height Blocks

All of the precision accessories shown . . . and more, too . . . are immediately available in a wide range of standard sizes or in special sizes to specifications. Complete line of layout plates, floor plates, cast iron and black granite surface plates offered, too. Send for your FREE catalog today.

MACHINE PRODUCTS Corporation

6771 E. MENICHOLS ROAD . DETROIT 12, MICHIGAN

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#### CAM MILLING

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

Your Inquiries Answered Promptly

HIMOFF MACHINE CO., INC. 23-22 44th Road Long Island City 1, N.Y.

Use postpaid card. Circle No. 426

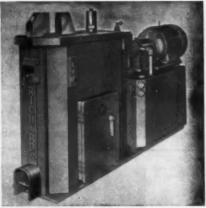
#### UNIVERSAL DIVIDING HEADS





CARROLL DIVIDING HEAD CO.
3525 Cardiff Ave. • Cincinnati 9, Ohio

Use postpoid card, Circle No. 427



Standard tooling provided eliminates need for special tooling job-by-job.

each machine to produce a very wide variety of bends, eliminating need for special tooling job-by-job.

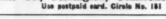
J. A. Richards Co., Kalamazoo, Mich.

#### Unit Points Solid Stock to 1/2"

A new pointer for steel, aluminum and brass mill applications has been added to the expanding line of Torrington rotary swaging machines. It is claimed to point solid stock up to ½" dia. and tubular material up to 1½" dia.

Unit is specifically engineered to handle mill operations, particularly where fast pointing and quick die changes are necessary.

Swaging Machine Div., The Torrington Co., Torrington, Connecticut.



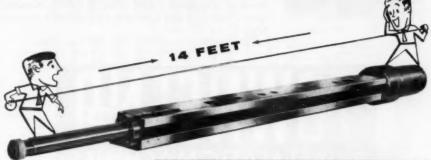


#### FASTER set-ups and positioning

You save set-up and positioning time with Gilbert rotary tables. *Hand-indexing:* 36" and 50" square or round. *Power rotary* and *power feed:* 36", 50", 60", and 72" square or round. Special tables built to your requirements. For complete descriptions and specifications, write for Bulletin 854.

THE CINCINNATI GILBERT MACHINE TOOL COMPANY . CINCINNATI 23, OHIO

## LONGEST ever built!



This POPE Precision Heavy Duty Boring Mill Ram is equipped with a Pope Precision Two-Speed Motor and with interchangeable extension spindles which can be removed and replaced in ten minutes by the clock.

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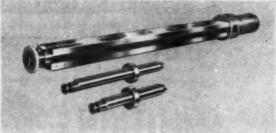
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Pope Deep Hole Spindles produce more holes per day because they have the rigidity to take heavy cuts.

They produce better finished ground holes and assure longer wheel life because shaft and bearing have excess capacity.

All rotating parts are **dynamically balanced** in full assembly to assure smooth running and good grinding.

The bearings are permanently lubricated for their entire operating life.

For better holes and more of them, specify POPE Precision Heavy Duty Deep Hole Spindles.

No. 126



ENGINEERS AND BUILDS STANDARD AND SPECIAL PRECISION ANTI-FRICTION BEARING SPINDLES FOR EVERY PURPOSE

POPE MACHINERY CORPORATION + 261 RIVER STREET + HAVERHILL, MASS.

Use postpaid card. Circle No. 429

November, 1959

257



Sizes 8" to 14" dias. Use postpaid eard. Circle No. 152

Centerless Regulating Wheels

Rubber bonded regulating wheels for centerless grinding operations have been recently added to the Simonds Worden White product line. These wheels are designed for use in all types of centerless grinding operations. They are reported as uniformly balanced with accurate dimensions, permitting precision grinding to closer tolerances, smoother finishes. Made of aluminum oxide, using a rubber bonding agent, type 1, 5 and 7 wheels are available in sizes from 8" to 14" dia.

Simonds Worden White Co., Dayton, Ohio.

# UALI-MATIC M

#### Finish, for a top automotive manufacturer, a speedometer magnet shaft by drilling and countersinking 2 diameters (A&B) maintaining concentricity with the main diameter (C) within plus or minus .002 total indicator reading with no damage to ground finish.

permits one man to operate 4 to 6 machines.

Townsend of Hartford, A Townsend High Speed Shaving Machine, with motorized drill attachment, produced 1200 pieces per hour-per machine. Exclusive automatic hopper feed



Townsend machines operated by one man-can accurately mass produce from 38 to 51 thousand pieces in one eight hour working day.

This same machine can be easily retooled for a NOTE: drilling, turning, or facing operation within range of 1/4 to 3 inches, from .080 to .625 diameter.

The H. P. TOWNSEND MANUFACTURING CO. HARTFORD 10 CONNECTICU

no need for Obsolescence

with BULLARD

## VERTICAL TURRET LATHES

In May, 1955, Hyster Company, Peoria, Illinois, installed a 36" Cut Master V.T.L., Model 75 and by the end of 1956 it

matically controlled machine was necessary. Did this obsolete the Cut Master? - No sir - it only meant adding a Man-Au-Trol Conversion Unit to Cut Master right in their plant. And it was accomplished in only four days. No need to obsolete Bullard Cut Master, Model 75 - just convert them.

was evident that due to increased requirements an auto-

Model 75

another way to cut costs when cutting metal\_buy BULLARD





ULLARD COMPANY BRIDGEPORT 9, CONNECTICUT

#### New Coil Cradle & Oiler Unit

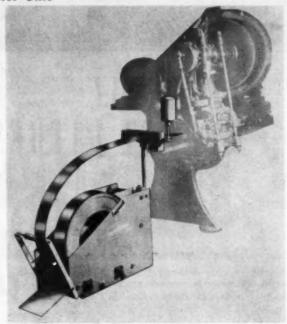
Automation in the press room is easily achieved through use of the Poweroll coil cradle and Clean-Oiler units which are illustrated feeding stock to a power press equipped with an automatic feed. The die itself has a built-in scrap chopper.

The complete coil cradle and oiler unit can easily be moved from one press to another, wherever the advantages of an automatic slack loop and stock cleaning-oiling are desired.

Able to handle stock to 24" wide by 48" dia. and up to 3000 lb. weight, the coil cradle can be loaded by one man in one minute. The metal coil is simply rolled up the ramp onto the power driven rollers.

eliminating need for crane or hoist. There is little danger of slippage or injury to personnel, the manufacturer states.

This combination feeds material to the operator, or automatic feed, permitting more efficient work and eliminating fatigue to operator. Spoilage is reported to go down. Abutting the



Metal coil is rolled up the ramp onto the rollers. Little danger of injury to personnel.

press, and needing no space for the slack loop stored above it, the combination unit saves valuable floor space.

Medelton Co., Inc., Bronx, N.Y.

Use postpaid card. Circle No. 153

#### **Pipe Joint Compound**

Plastic Lead Seal, industrial pipe joint and thread sealing compound, is

#### LAPPING PLATES

4 SIZES

.0001" FLATNESS

Annealed fine grain lap iron. Integrally cast trough catches excess, saves diamond dust.

IMMEDIATE SHIPMENT ON THESE STOCK ITEMS

1/4" squares 6" x 9"-\$42.50

3/8" squares 9" x 12"-\$53.20 15" x 18"-\$96.80

AMERICAN LAP COMPAN



Any size serrations upon request

20182 SHERWOOD . DETROIT 34, MICH.

Use postpaid card. Circle No. 432

now available in miniature tubes especially designed for original equipment manufacturers' installation and conversion kits. In addition, other kit uses such as replacement, maintenance, repair and the increasing popular "doit-yourself" types are also recommended.

This compound is widely used in refrigerant, chemical, petroleum, LP

and natural gas, water, steam and many other comparable services. It prevents seizing and galling and lasts for the life of the connection—yet allows easy disassembly because it remains permanently plastic. Temperature range is to 550° F., pressures to 6000 psi.

Crane Packing Co., Morton Grove, Illinois.

Use nostnaid card, Girele No. 154

#### CHICAGO PRESS BRAKES

UNEXCELLED ACCURACY



Press Brakes Press Brake Dies Straight-Side-Type Presses Hand and Power Bending Brakes Special Forming Machines



on any press brake work upon request

DREIS & KRUMP
MANUFACTURING CO.
7440 S. Loomis Blvd., Chicago 36, Illinois

Use postpoid card, Circle No. 433

November, 1959

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OOK

261

#### **Tool Simplifies Vertical Alignment of Machines**



In 36", 48", 60" heights. Use seetpald eard. Circle No. 155

A means of simplifying vertical alignment of machine tools is provided by the new Davis "Tru-Plumb" tool—a vertical, machined-steel column mounted on a 17" dia. base. Placed on a machine tool table, it serves as a reference for checking alignment of vertical and horizontal spindles, headstocks, columns, end supports, and other machine components by means of dial indicators. The tools are available in 36", 48", and 60" heights with guaranteed accuracy of .0002" per foot of length.

Davis Div., Giddings & Lewis Machine Tool Co., Fond du Lac. Wis.



Separate die sets with even upward pull.

Die sets separate evenly and safely.

When you have die set pullers that remove the punch holder from the die shoe by a straight upward pull and the punch holder slides upward from the die shoe simultaneously and safely from both leader pins, you have Acro Die Set Pullers and you're saving time.

If you're not, this is how it's done with Acro Pullers: Indexed screw wrenches act as indicators, controlling the upward travel. This is an exclusive patented Acro feature and found only in ACRO DIE SET PULLERS. It may pay you to investigate. Write for further free information today.

OTHER ACRO TIME SAVERS FOR YOUR SHOP include Acroflex, drill rod racks, leader pin oilers and wing nuts. Write for complete descriptive folder. Ask for bulletin TP59.







Write for complete details and delivery schedule ..

#### FERRACUTE MACHINE COMPANY

Since 1863 Manufacturers of Power Presses and Special Machinery BRIDGETON, NEW JERSEY

Use postpaid card, Circle No. 435

OOK

clutch.

#### **Hydraulic Chuck Actuator**



Controlled leakage as an asset.

Use postpaid card. Circle No. 156

This Gamet hydraulic chuck actuator, widely used in Europe, is now available through Power-Grip, Inc. It is designed to operate power chucks on lathes and other machine tools, but can also be used in any type of machinery where thrust and linear movement are needed in a rotating shaft or tube. Featured is controlled leakage, which will not increase as the actuator is used. The large, unobstructed hole through the unit's center permits full use of the hole through the spindle, improving chuck's use.

PowerGrip, Inc., Rockfall, Conn.



COMBINING PRECISION, QUALITY, ECONOMY

## AND WE CAN **PROVE**

15" Model (1100) Also Available . . . Variable Speed or Step-Pulley

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- · MULTIPLES, TABLE, BENCH, FLOOR MODELS
- FINEST CARBON STEEL SPINDLE
- · CHOICE OF TABLES (MODEL 1100)

DIAL YOUR SPEED! 250-1750 RPM or 170-900 RPM HAND OR AUTOMATIC MECHANICAL FEED







20" STEP-PULLEY! Greatest speed range in the field! Available for slow speeds as low as 150 RPM or high speeds to 5000 RPM or more.

DIAL YOUR SPEED 40 to 4600 SFM Model 86 20" Metal Cutting Band Saw

**GET FULL DETAILS** AND SPECIFICATIONS NOW!

DEALERS IN PRINCIPAL CITIES



Dept. 2 McMinnville, Tennessee

Use postpaid card. Circle No. 437

E BOOK



Use postpald card. Circle No. 438



Sale for aperator—sheeve arts as goard—unprotected, unsupported blades become a hazard to face and body of operator when cutting pressure is applied.

NEW BAJ ONE-PASS

#### The Baj Tool Company

(Mannfacturers of Baj and Cleany Bresches) 19751 St. Clair Avenue, Cieveland 19, Ohio Use postpold eard. Circle No. 439 **Hydraulic Roll Marking Machine** 



Three pressure ranges of 6, 12, and 20 tons.

Model HHRMA Automark is complete with pump, motor, oil reservoir, valves and electric controls in three pressure ranges of six tons, twelve tons, and twenty tons. Special units may be built to suit individual pressure requirements.

Electrical remote control can be used for hand, foot or fixture actuation. Five sequences of operation are provided. The marking head, controlled by the operator, can be made to roll across the work a predetermined number of times to give greater depth of penetration to each mark by use of optional equipment. With attachments required, the table can be raised or lowered for all sized or shaped parts.

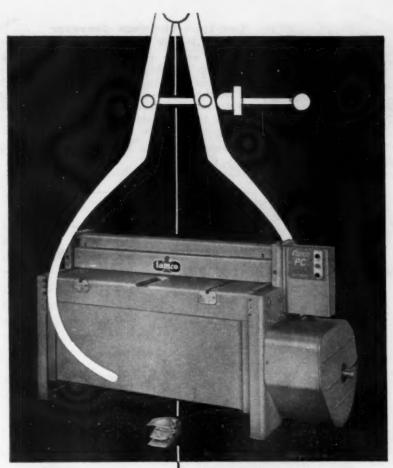
The unit marks rounds, flats or contoured surfaces. Speeds are up to 6000 one inch strokes per hour, or 900 maximum travel strokes are obtainable. The maximum up and down travel of the ram is 1". The cross slide stroke is adjustable, without tools, from \(\frac{1}{2}\)" to over 8".

Automatic feed fixtures can be supplied, easily synchronized with the machine by use of the remote control.

Defiance Machine and Tool Co., St. Louis, Mo.

Use postpaid card. Circle No. 157

MACHINE and TOOL BLUE BOOK





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BOOK

#### MACHINE COMPANY

Kenosha, 5 Wisconsin

**Only Famco Squaring Shears** enable you to have a shear tailor-made for your specific needs.

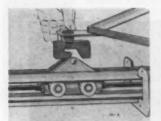
Available in 22 standard models (foot, air, power and high speed) and cutting widths ranging from 22 to 96 inches. We are also the largest builder of special shears in the country and we invite your inquiries of these sections. inquiry on these.

May we send you our Squaring Shears brochure?



Manufacturers of: Milling Machines, Presses • Air, Arbor, Power, Foot • Squaring Shears, Band Saws.

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Tows 1,000 lb. or more. Use postpaid eard. Circle No. 158

#### Tow-Type Chainless Conveyor Carries Heavy Molds or Parts

Gross weights of 1000 pounds or more can be towed by "Chainless" conveyors. The two-type conveyor can be installed in-the-floor, on-the-floor, or overhead. The conveyor is used with standard or specially built floor trucks. A tow-bar attached to the front axle of the truck is manually engaged in the trolley attachment.

Conveyor Div., The American MonoRail Co., Tipp City. Ohio.



Save Space, Weight & Piping



NO SEPARATE VALVES TO MOUNT OR PIPE ..., Modernair's VIH cylinders have directional and exhaust speed control valves built in!

#### FEATURES:

- \*COMPACT CYLINDER-VALVE "PACKAGE" includes builtin directional control, exhaust speed control valves.
- \*SOLENOID, BUTTON BLEEDER or PILOT PRESSURE valve operation.
- \*INTERCHANGEABLE MOUNTINGS.

#### BRIEF SPECIFICATIONS: "

DIAMETERS: 142", 2", 3" ROD SIZES: 42", 34" MIN. OPERATING PRESSURE: 20 p.s.i.

MAX. OPERATING PRESSURE: 150 p.s.i. (solenoid)
200 p.s.i. (bleeder or pilot pres.)

Write for catalog, prices today—or phone your local MODERNAIR distributor (listed on your phone book Yellow Pages).

Modernair CORPORATION

Dept. N-11, 400 PREDA STREET, SAN LEANDRO, CALIF. 5007 BROOKPARK RD., CLEYELAND 34, OHIO

Use postpaid card. Circle No. 441

New 30HP "CHOP" Saw Ends UNDERPOWER Problems

#### CUTS

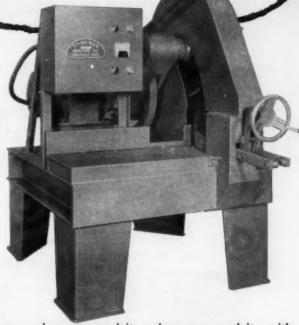
Steel structurals
Bar stock
Heavy cable
Pipe
Test sections
Forging blanks
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High temperature alloys Rigging steel

Fixtures and jigs

Cross ties

Heavy wooden beams



Now... power when you need it—where you need it—with the radically new 30 HP "CHOP" Saw for wet or dry cutting. Advanced features include more powerful main motor, sealed-bearing spindle, timing belt drive, and a new dynamic suspension system that permits light fingertip feed without springs, counterweights or adjustments. Provides straight or variable-speed oscillating feed at option of operator. Screw-operated double vise quickly adjusts to handle up to 8" x 8" sections or solids.

Ty-Sa-Man

Write for FREE BROCHURE

TY-SA-MAN Machine Co., Inc. 800 White Ave., Knoxville, Tenn.

Use postpaid card, Circle No. 442

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#### Bering Heads



Adjustable dovetail ground from solid, Use postpaid eard, Circle No. 159

with piloted-type interchangeable shanks, which provide for concentricity of the tool holder. Featured also is adjustable dovetail ground from the solid. Two clamping screws are arranged so all the cutting strain is against solid metal. Exclusive adjusting screw nut affords adjustments for wear to be made without dismantling the tool. Boring head accommodates both ½" (Model 50) and ¾" (Model 50A) round tools. Heads are also available for tool sizes from ¾"-1½" in standard units; up to 3" in specials.

Maxwell's new No. 50 boring head line is designed

Maxwell Industries, Inc., Ashtabula, Ohio.

- Removing chips, shavings, filings, and airborne debris that clog machinery, distort tolerances, mar product finishes.
- Controlling mists and fogs in wet machining operations.
- Recovering valuable dusts, coolants, heated air.
- Protecting machinery investments with preventive maintenance.

FREE...latest specs and data on TORIT Dust Collectors for handling these and other air pollution problems.

TORIT: the high efficiency line with savings up to 1/2!

Reducing absenteeism with improved health and safety precautions.

WRITE TODAY:

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1133 Rankin St., St. Paul 16, Minn., Dept. 614

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## AUTOMATIC POSITIONING with the DIXI 75

horizontal optical jig borer offers you increased ACCURACY VERSATILITY PRODUCTIVITY

Made in Switzerland Measurement in inches



- Automatic positioning can be changed instantly to manual operation
- Projected optical setting—direct reading to 00005" for linear motions and 1 sec. of arc for built-in rotary table.
   Linear optics provided with adjustable zero reference
- Simplified controls functionally arranged for greater operating speed and efficiency
- 3" diameter boring spindle
- Increased capacity: table size 393's" x 32": 295's" cross travel; 233's" longitudinal travel; 253's" vertical travel
- Hydraulic feeds and infinitely variable spindle speeds.
- Rear support optional

See the DIXI 75 in operation at the NATIONAL METAL CONGRESS AND EXPOSITION BOOTH 1346

International Amphitheater, Chicago NOVEMBER 2nd — 6th

#### M. B. I. EXPORT & IMPORT LTD.



A DIVISION OF MACHINERY BUILDERS, INC. 475 Grand Concourse, Bronx 51, N. Y.

"Over 25 years' experience in designing and building machinery."

Use postpaid card. Circle No. 444

#### Nibbler Cuts Odd-Shaped Holes in Difficult Places



Cuts 14 ga. stainless, 13 ga. mild steel.

Use postpaid card, Circle No. 160

Fenway portable nibbler Model MN, weighing 8 lb., cuts 14 ga. stainless and 13 ga. mild steel without distortion, either side. It is also reported to cut inside circles, squares, odd shaped holes in any kind of inaccessible place, with edges smooth, no chipping or binding. Periodic sharpening of the punch and die keeps cutting action at 100% efficiency. Unit works well on copper, brass, aluminum, mild stainless, galvanized and corrugated steel.

Fenway Machine Co., Phila., Pa.

## the names that stand for **production** in the metal-working centers of America



These are the most profitable cold work die steels at the disposal of the diemaker today, in down-to-earth performance per dollar per pound. Each is an air-hardening grade, each has its unbeatable area of application. Only three names to remember—AIR HARD, OHIO DIE, CROCAR—and you've got it made! Check us for the technical data you can use.



#### **Vanadium-Alloys Steel Company**

LATROBE, PENNSYLVANIA

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Angle Block With Air Lift Control

An improved type of granite angle block features "air lift" control which allows the operator to guide the heavy block into position with merely a finger touch. The block actually "floats" on a cushion of air. This helps preserve the accuracy of the angle block and surface plate. Air will escape if the block is moved too close to the edge of the surface plate—a safety feature. A complete line of two-faced and four-faced angle blocks are available with accuracies of ± 1 sec.

Herman Stone Co., Dayton, Ohio.
Use postpaid card. Circle No. 172

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2-faced & 4-faced angle blocks offered.







Use postpaid card. Circle No. 478



Use postpaid card. Circle No. 479

OK



Diamond Wheel Dressers

Guaranteed to be full, individual stones, mounted in 7/16 x 6" cold rolled shanks

Carat Price 1/4—\$ 2.25 1/2— 4.00

1/2 4.00 3/4 6.00 1 8.25 1/2 12.00

2 — 16.00 2½— 20.75

-3 — 25.50

Allstate Diamond Products, Inc.

Manufacturers of a complete line of diamond tools and wheels 245 W. 27th St. New York 1, N.Y \*Dealers inquiries invited

Use postpaid card. Circle No. 490

FOR SMALL INTRICATE INTERMAL CUTTING, WE OFFER THREE PRACTICAL FORMS WITH PRESISION GROUND MELICAL AND SPIRAL RELIEF DESIGN.

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CARBIDE \*\*

Solution

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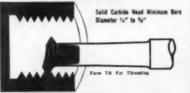
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R. B. TOOL CO., INC. NOW AT 340 MAPLE AVE., WESTBURY, M.Y. NEW ADDRESS Write for Catalog—Dept. BB

Use postpaid card. Circle No. 448

**Automatic Lubricant Dispenser** 

The new A-L-D (automatic lubricant dispenser) is designed to dispense oils, light grease, liquid soaps, tap lubricants, glycerine, and many other liquids. It eliminates oil cans, daubers, and measuring devices. The dispenser may be purchased separately or with the reservoir and actuating switch. The unit is priced at \$59.00.

Logansport Machine Co., Inc., Logansport, Ind.

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ARROW "QUICK-LOK" COLLET VISE



COLLET VIS DRILLING, TAPPING, MILLING FIXTURE

Uses 3C, 1A and 5C Collets—\$29.50 to \$82.50

#### ARROW \*\*\*\* MACHINISTS

154 EAST 3RD STREET, MT. VERNON, N.V. Use postpaid card. Circle No. 491



WIND YOUR OWN

#### SPRINGS

Porter Spring Winder

Widely used to make springs to 11/4-inch I. D., for repair, experimental work and small production runs. Low in cost, Handles wire to 3/16" diameter. WRITE FOR CATALOG.

ADVANCE CAR MOVER COMPANY, INC.
APPLETON, WISCONSIN

Use postpaid card. Circle No. 477



At new low price \$124,50 with diamend

#### New 1959 Model "SS" RADIUS DRESSER Outperforms them all

Cut production time without sacrificing accuracy! Easy to set, easy to set, easy to see, easy to see, easy to see, easy to see, eliminates necessity of guard re-moval. Somerses Radius Dresser turns "tricky" jobs into routine operations. Write for free illustrated folder.

SOMERSET TOOL CO. Hillside, N. J.

Use postpaid eard. Circle No. 449

MACHINE and TOOL BLUE BOOK

#### High Speed Steel Single-End End Mills

Hi-Lo end mills, a new line of high speed steel single-end end mills, is said to combine high quality and high precision with low purchase price. It is reported economical to replace rather than resharpen the mills on high production jobs, but they may be easily resharpened, if desired. These end mills, four-flute, RH cut, RH spiral, are available in six sizes from 1/8" to 1/2" end mill dia.

O.K. Tool Co., Inc., Milford, N.H.



Six sizes from 1/8" to 1/2" dia. Use postpaid eard. Circle No. 162

#### NEW CORE DRILL INCREASES PRODUCTION

#### EIGHT TIMES

Wetmore Gun Type Core Drills equipped with Throw Away Carbide Tips reduce machining time from 25 to 3 min, producing 1 34" dia, holes in one pass in heat treated, cast manganese-molybdenum steel parts. The operation is performed at Web Wilson Oil Tools, Inc., Gardena, Calif.

2 Core Drills are used in a special 2-spindle horizontal machine designed and built by Web Wilson. Parts are loaded and unloaded on a 2 position rapid traverse table while another part is in the work position being machined. Operation was formerly done on a drill press requiring separate drill and reaming operations.



Wetmore Core Drills machine 112 holes per tip. Previous HSS drill & ream method produced 10 holes per regrind.



Workpiece-Oil Drill Pipe Tong Jaw. cast alloy steel, heat treated for maximum strength.

#### OTHER ADVANTAGES OF WETMORE CORE DRILLS

Throw Away Carbide Tips—Square tips provide 8 fresh cutting edges that can rapidly be reset at the machine by the operator.

No regrinding required-Precision ground tips are readily replaceable and fit into precision ground seats-no adjustments required, fast tip resetting and renewal.

Less Tool Cost-Cost of tips is less than normal consumption of high speed drills and reamers. On this job 112 holes machined per tip compared to 10 holes per sharpening of high speed steel drills.

Eliminates Reaming—These Core Drills open up a rough hole in one pass removing 1/5" material on a side and produce a superior finish within .0005".

Use Wetmore's Fast, Complete Service for a full line of Standard stocked cutting tools as well as Special Cutting Tools designed from your drawing or part.

#### Wetmore Tool and Engineering Co.

5320 E. Washington Blvd., Los Angeles 22, California



November, 1959

Cutters

Form



Cutters Cutters

Milling

Cutters

Core End Mills Port Contour Tools **Drills Routers** 

Reamers

# Ohler HYDRAULIC COLD

## SAWING MACHINES

VERTICAL, RIGID, HIGH SPEED TYPE.



**AVAILABLE IN THREE** SIZES TO 15 3/4" CAP.

AUTOMATIC OR SEMI-AUTOMATIC COMPARISON WILL CONVINCE YOU OF THE OUTSTANDING AND SUPERIOR PERFORMANCE OF OHLER EQUIPMENT

EXCLUSIVE FACTORY AGENT

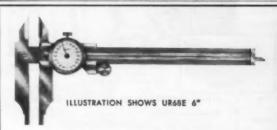
#### JAMES W. GEORGE MACHINERY CO.

519 E. Jefferson Ave.

Detroit 26, Mich.

OR YOUR DEALER See our exhibit ASTE Show, Detroit Artillery Armory, April 21-28, booth No. 555

Use postpaid card. Circle No. 481



#### **HELIOS High Precision Dial Calipers**

- . SAVE TIME
- . SIMPLE FAST
- . ACCURATE READINGS
- . NO EYE STRAIN

Also available in 8 and 10" sizes

Ask for catalogs on other HELIOS Calipers, Vernier and Dial, also HELIOS Parallels, Hole Gages, Telescope Gages, Radius Gages.

Karl A. Neise, Dept. MT-119 404 4th Ave., New York 16, N.Y.



Use postpaid card. Circle No. 451

#### Disc Type Micrometer Measures In Close Quarters

Designed to measure the thickness of closely spaced sections such as narrow grooves, slots or recesses, the No. 256 Series disc type micrometer can be used where clearances



are as limited as .015". Featured are thin, tapered anvil and spindle discs, both  $\frac{1}{2}$ " diameter,  $\frac{1}{16}$ " thick at the center and only .015" thick at the outer edges.

This micrometer is available in 0 to 1" size with graduations in thousandths of an inch. It can be furnished with or without lock nut or ratchet stop.

The L. S. Starrett Co., Athol, Mass.

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Put Muscles In Your Lubricants



ANTI-FRICTION COMPOUND

A clean white powder. Improves cutting cils. Dies last longer. Solves tough lubrication problems. Ask for free samples.

SCIENTIFIC LUBRICANTS CO. 3469 N. Clark St. Chicago 13, III.

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#### New Discovery LAPS EVERYTHING!

CERAMIC-BRASS-CARBIDE-PLASTIC-STEEL

Lasts for years

Nover Loads - Soif Cleaning - Indestructible

Money Back Guarantes



GRITS: 180-220-360-500 \$8.75 Newteels Inc. Amityville, New York

Use postpaid card. Circle No. 453 November, 1959





#### Swivel Jaw Vise Now in 31/2" & 6" Jaw Widths



Lifetime lubrication offered. Use pestpaid card. Circle No. 165

Aircraft manufacturers and other close tolerance tool makers can now obtain the Wilton Tool Mfg. Co.'s swivel jaw vise in two new sizes. Formerly in the 41/2" size only, the vises, designed to hold tapered or irregularly shaped workpieces, are now offered in 31/2", 41/2", and 6" jaw widths. Featured are extra strength malleable castings, unconditional five-year guarantee, lifetime lubrication, five dffferent types of jaw faces, close tolerance machining.

Wilton Tool Manufacturing Co. Inc., Schiller Park, Ill.

Are you asking him to control a precision machine without a precision gage?



- 1. exact hole size, readable to a fraction of .0001" (a fixed - not passing - reading).
- 2. front or back taper, exact amount of.
- 3. ovality, exact amount of diameter variation.
- 4. bell mouth or barrel shape.

Self-centering and self-aligning Comtorplug assures precise gaging, easily and simply, independent of operator variations. For holes from 1/4" to 10" diameter.



For holes 1/a" to 10" diameter

#### COMTORPLUG USERS INCLUDE

Allison Div.
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Chrysler Corp. urtiss-Wright Dana Corporation Detroit Transmission Douglas Aircraft

iresearch Mfg. Co. Fairchild Engine & Airplane Co. Falk Corp.
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Lycoming Spencer Div. McDonnell Aircraft National Lead National Lead Narrhrap Aircraft Pontiac Mater Div. Scintilla Magneta Steel Products Eng. Studebaker-Packard Sylvania (Atomic Div.) United Airlines. United Airlines Warner Gear Div

#### SEND FOR BULLETIN 50-

COMTOR COMPANY, 62 FARWELL ST., WALTHAM 54, MASS.

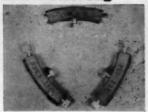
OMTORPLU



#### Three Aluminum Weights Speed Grinding Wheel Balancing

Aero Supply Mfg. Co., Inc. has developed a set of three infinitely adjustable aluminum weights, for use instead of the traditional four solid brass weights, which makes possible the precision balancing of a grinding wheel in minutes after the wheel is in balance position. The weights may be used in conjunction with all existing types of balancers. They are infinitely adjustable by means of two balance screws which permit micrometer adjustment of the weights, it is reported.

Aero Supply Mfg. Co., Inc., Corry, Pa.



For existing types of balancers.
Use postpaid eard. Circle No. 196



\*Super-Strong
Flonge Construction
All surfaces ground
for extreme accuracy
full length bearing
an ground bar and
machine ways "Steal
jaws "Work holding
surfaces are always
of true right angles,
or parellel to the
table "Large Acm
steal screw with re
slaceable broase sut



MOGUL
Jaws %" thick, 8%"
wide and 2%" deep
open 6" when in
place. Wt. 140 lbs.
ONLY \$180,00

MASTER

Jews ½" thick, 6½"

wide and 2" deep
apen 4" when in
place. Wt. 90 lbs.
ONLY \$90,00

JUNIOR
Jaws ¾" thick, 4½"
wide and 1¾" deep
open 2¾" when in
place, Wt. 40 lbs.
ONLY \$60.00

## L-W ADJUSTO-QUICK CONTROL DRILL PRESS VISE AND FIXTURE HOLDER

The first wide range drill press vise that sately handles both rigid and non-rigid work without distortion. Quick action and adjustable pressure at the turn of a knob. Easy hand pressure on hardened and micro-ground bar locks and holds the work.

Precision-built to cut tooling costs and increase production. Heavy removable jaw inserts allow simple, quick adaption for low-cost figs and fixtures. Milling Machine vises svailable with or without owival



" Model (5½" Opening)
" Model (6¼" Opening)

\$31.50 \$44.00 \$57.50

See You Industrial Supply Distributor Or Order Direct, Giving Distributor's Name

(81/2" Opening)



Toledo 4, Ohio





Indicates changes in pressure.

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#### **Motor Load Indicator**

A motor load indicator is now available as optional equipment on the Blanchard No. 11 and No. 18 Vertical Surface Grinders. It is designed to replace the ammeter in the wheel motor circuit, to indicate very slight changes in pressure between grinding wheel and work. An ammeter, measuring current to a lightly loaded induction motor, is relatively insensitive to small changes of power, the company states, but the new unit, with its built-in corrective network, is sensitive to the power, rather than current alone.

The Blanchard Machine Co., Cambridge, Mass.

#### Even without pilots or finger stops . . .

## "RFC" Automatic ROLL FEEDS\*

## control feeding to utmost accuracy

#### REVERSES INSTANTLY

Shift Feed Finger spring from one lug hook to opposite side

#### CAN'T SLIP

Each wedge has 4 points of contact

#### NO RATCHETS OR PAWLS . . .

to wear down

#### PATENTED CLUTCH MECHANISM..

with fewer working parts for less maintenance

PATENTED

Write for new brochure containing 39 standard feeds which are applicable to all METALS, FELT, CARDBOARD, PLASTICS, PAPER, WIRE, RUBBER in ALL WIDTHS, LENGTHS and THICKNESSES.

IMPORTANT: Please state make, type and tonnage of press when inquiring.



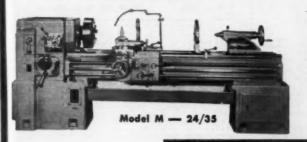
MANUFACTURERS OF QUALITY FEEDS FOR POWER PRESSES
Use postpoid card. Circle No. 458

## UNBELIEVABLE VALUES!... IMPERIAL PRECISION LATHES

SWING TO 100 SWING CENTERS UP TO 300" CENTERS

LIBERAL TERMS RENTAL PLANS

Model PS -34/61



Flame hardened, ground bed ways. Heat-hardened gears throughout. Precision roller spindle bearings.

Sizes in inches **Basic Price** 12x40 \$ 1393. 14x40 \$ 1593. 16x40 \$ 2084. 18x40 \$ 3447. 20x40 .\$ 3647. 24x40 \$ 8220. 31x40 \$ 9790. 34/62 sliding bed x 60 \$13790. 34x60 \$11180. 45x57 \$16980. 67x57 \$21280. Extra large holes through the spindles up to 131/2"



## AARON MACHINERY CO.

PEPT. BB 45 CROSBY ST., N. Y. 12 Use postpaid card, Circle No. 459 BRANCHES AT:

BUFFALO, N. Y. MINEOLA, N. Y. LOS ANGELES, HOUSTON, TEXAS TULSA, OKLA.

RICHMOND, CAL LOS ANGELES, CAL.

See other ad Page 293

Advertisements acceptable in THE MARKET PLACE include those for employment, sales services, production facilities, representation and related needs. Rates: \$20 per column lack per insertion. Maximum size advertisement accepted in this section is three inches.

Copy should reach us by the first of the month for next month's issue.

MACHINE and TOOL BLUE BOOK

A Hitchcock Publication

Wheaten, Ill.

### Kelm

#### T-SLOT CLEANER

Cuts costly "clean-up down-time"

- SPEEDS SET-UPS
- REDUCES DAMAGE TO MACHINE

One end sleans slogged T-slots . other end spoons out chips is seekets of mashine tables—quiekty and officiently. Paint brushes are uso-less for soggy, sharp, jammed chips. Compressed air is hazardeus. Kelm T-slot Cienner is made of durable 15 gs. stool, chrome piated. Thousands are in use. \$1.25 es. \$12 per doz. Also available from dealers. Send for literature.

KELM MFG. CO. COLOMA

## ETATE SHEETS? UP TO 1/4" THICK Ideal for MaSheet sizes 20" x 50" Safety Shields THE ARTUS CORPORATION COVERS

201 S. Dean St., Englewood, N. J. formerly INDUSTRIAL PRODUCTS SUPPLIERS



,9003 Hele Lesation in One Minute Trousands of companies and individuals have proven and accepted our EDGE FINDERS for years. Ask for literature with users list and dealers in your area, Hardened and ground en all surfaces including contours for balance, 500° size \$2.50. Deluxe .200° size \$10.00. Vise stop for holding same hole location in several pieces \$2.95.

Postpaid Except C.O.D. Charges GLOVER MFG. CO. 423 PARK AVE. MEADVILLE, PA.

#### CREATIVE ENGINEERING

Harry Conn presents some much needed information to enable you to compute power requirements for tap-ping and threading. Be sure to read pages 89 to 102.

#### HAND TAPPER

Spindle Guided (retains and moves up & down on spindle) Tee-Handle No. 6—8/16 Tay Wreach—Fits Drill Chuck on Press or Lathe. \$10.00 Postpaid



B-Square Engineering Co. Box 11281 Fort Worth 10, Texas



-Tested Know-How & Show-New-

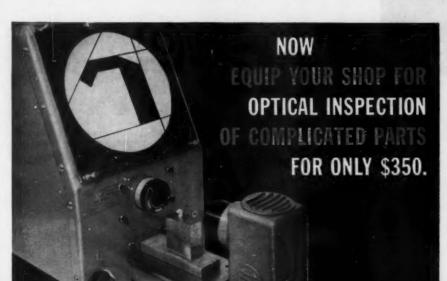
#### MACHINE TOOL RECONDITIONING

Send for free folder describing illustrated book featuring hand scraping methods (3rd printing)

Machine Tool Publication 215 Commerce Bidg. East 4th Street



"When we converted to automation, we made new jobs for our employees.



#### Projecto Graph Model A10

Accurate inspection of parts requiring visual projection for production control no longer requires an expensive first investment.

A single Projecto Graph Model A10 will speed inspection in your shop and increase accuracy for an initial cost of only \$350.

Projecto Graph Model A10 comes complete with a single lens. You can choose magnifications from 10X to 100X, precision ground stage and all components necessary for basic operation. It can be set up in less than a single working day.

When inspection requires, a series of Projecto Graph Model A10s can increase your capacity. If changing designs require additional inspection devices, these can be added to your Projecto Graph equipment as supplemental parts at extremely competitive prices.

Accessories for Model A10: Focusing stage, Coordinate Measuring Stages, Center Supports, Surface Illuminators, Special Fixtures, designed and manufactured by Projecto Graph to suit your needs.

Send for complete details...just address a card or letter to Projecto Graph, Clinton, Conn. We will send you a complete catalogue of Projecto Graph models and accessories, without obligation. PROJECTO GRAPH

Use postpoid card. Circle No. 475

## don't overlook these features

- Chipless Machining—The Floturning process—flowing metal over a revolving mandrel—is used for producing missile and rocket parts, but there are many applications of it that other manufacturers can consider.
  Page 105
- Undercutting and Chamfering. To machine seatings on large castings you can swing them on a lathe. However, it is more economical to use a radial drill press if suitable cutting tools are designed.

  Page 113
- Industrial Relations. Educational programs need a gimmick to make them real and lasting. Read about the "Economics Puzzle."

  Page 117
- Cold Point Drilling—With this single hollow core allowing ample coolant at the cutting zone of the drill, the tool and work remain cool. All materials have been drilled successfully.

  Page 122
- Pre-Release Review affords a good opportunity for product design and manufacturing engineers to review together the drawings and working model of the product before it is released for production.

  Page 127

#### EDITORIAL STAFF

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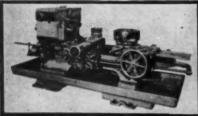
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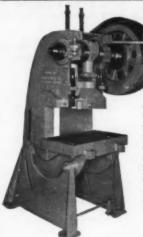
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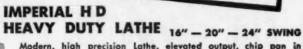
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1 48-34-47-28-30 4 2 48-34-72-80-30 4 40-44-46-46-36-36-64 4 72-30 49-44-36-56-90-64 7 72-30 352-35-40-45-56-00-64 7 72-30 352-35-40-48-56-00-64 7 72-30 352-35-40-48-56-00-64 7 72-30 352-35-40-48-56-00-64 7 72-30 36-40-48-56-00-64 7 72-30 36-40-48-56-00-64 7 72-30 36-40-48-56-00-64 7 72-30 36-40-48-56-00-64 7 72-30 36-40-48-56-00-64 7 72-30 36-40-48-56-00-64 7 72-30 36-40-48-56-00-64 7 72-30 36-40-48-56-00-64 7 72-30 36-40-48-56-00-64 7 72-30 36-40-48-56-00-64 7 72-30 36-40-48-56-00-64 7 72-30 36-40-48-56-00-64 7 72-30 36-36-40-48-56-00-64 7 72-30 36-36-40-48-56-00-64 7 72-30 36-36-40-48-56-00-64 7 72-30 36-36-40-48-56-00-64 7 72-30 36-36-40-48-56-00-64 7 72-30 36-36-40-48-56-00-64 7 72-30 36-36-36-40-48-56-00-64 7 72-30 36-36-36-40-48-56-00-64 7 72-30 36-36-36-40-48-56-00-64 7 72-30 36-36-36-40-48-56-00-64 7 72-30 36-36-36-40-48-56-00-64 7 72-30 36-36-36-40-48-56-00-64 7 72-30 36-36-36-40-48-56-00-64 7 72-30 36-36-36-40-48-56-00-64 7 72-30 36-36-36-36-00-64 7 72-30 36-36-36-36-00-64 7 72-30 36-36-36-36-00-64 7 72-30 36-36-36-36-00-64 7 72-30 36-36-36-36-00-64 7 72-30 36-36-36-36-00-64 7 72-30 36-36-36-36-00-64 7 72-30 36-36-36-36-00-64 7 72-30 36-36-36-36-00-64 7 72-30 36-36-36-18-20-24-27 72-30 36-36-18-20-24-27 72-30 36-36-18-20-24-27 72-30 36-36-18-20-24-27 72-30 36-36-18-20-24-27 72-30 36-36-18-20-24-27 72-30 36-36-18-20-24-27 72-30 36-36-18-20-24-27 72-30 36-36-18-20-24-27 72-30 36-36-18-20-24-27 72-30 36-36-18-20-24-2	90				1-9/4	8-8-10-19-14
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i	200	0/16	12-18-29-24	1-0/10	8-10-12-10-18-20	
1 2	32-38-48-48	8/8	11-12-18-29-24	1-5/8	8-10-12-14-16-18-26	
1 3	82-36-40	11/16	10-16-24	1.3/4	8-10-12-14-18-18-29	
8.	M-34-49	13/16	16	1-13/16	8-10-12-14-10-18-29	
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174	20-28-32	1-1/8	7-12	2	456 - 18-12	
8/18	18-30-24-25-32	1-1/4	7-12-16-18	1		

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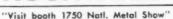


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